Vol 7, No. 10 OCTOBER, 1952

AGRICULTURAL CHEMICALS

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Fertilizer Safety Program Announced

POWCO BRAND

KILLING POWER—THAT'S THE THING!

Now the Southeastern insecticide industry can be served *fast and well* by the only firm specializing in basic insecticide materials for the independent manufacturer.

Our new plant in Atlanta is specially equipped to produce DDT, Toxaphene, BHC and other agricultural and household insecticide concentrates. The Atlanta location—hub of rail and truck lines serving the Southeast—assures swift, even overnight deliveries.

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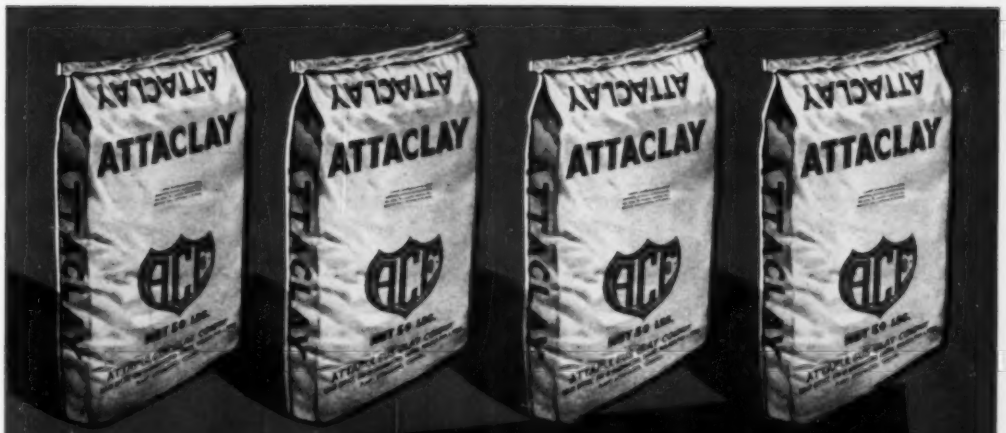

Formulation Problems *Solved Profitably* with ATTACLAY

Today, Attaclay—the unique carrier and diluent—is used by practically all of the nation's larger producers of pesticide dust concentrates.

There are good reasons why. When free-flowing, highly sorptive Attaclay is in the formula, the capacity of mills—and that of the rest of the dust-handling equipment—goes up as much as 50%. Attaclay transmits its own natural fluidity and lump-free fluffiness to the product, making each item more desirable—more sellable. Which is another way of saying that Attaclay has proven its ability to reduce production costs, improve products, widen profit margins.

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So, if you have a carrier or diluent problem and want to be sure of solving it *profitably*, discuss it with us. We will gladly provide a generous working sample of Attaclay and technical help.

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we explore all the corners . . .

We explore every corner of the earth to supply raw materials to manufacturers of fertilizers and agricultural chemicals. If you have a supply problem, write, wire or phone us today.

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AGRICULTURAL CHEMICALS

THIS MONTH'S COVER

Insecticides and fungicides are given intensive tests at the DuPont experimental farm in California. Pictured here are treated beds of strawberries being inspected by M. C. Swingle, in charge of the station and F. H. McDiarmid, an assistant. (See story on page 54, this issue.)

VOL. 8 No. 10
OCTOBER 1952

A Monthly Magazine For the Trade

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AGRICULTURAL CHEMICALS

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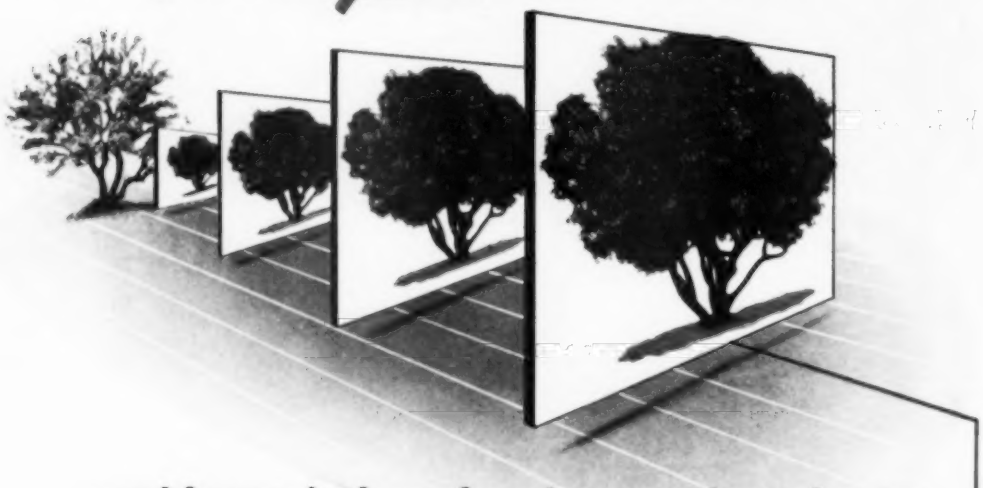
Entered as second-class matter November 4, 1949, at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

It's a fundamental fact . . .

SEQUESTRENE

puts the *Green* back into crops



and keeps it there for nine months or longer

Mineral deficiencies in crops have been with us like the unsolved crime down at the police precinct — only longer. Now, for the first time, research presents a bona fide lead toward solving the fundamental problem of how to enable crops to assimilate minerals in which they are deficient and thereby promote better growth and bigger yields.

Sequestrene* iron complexes have corrected one of the most difficult mineral deficiencies to cure, iron chlorosis. Field tests employing formulations of Sequestrene and ferrous sulphate on citrus have transformed yellow leaves to brilliant green and have infused a new rich growth in crops that were dying.

These changes were accomplished within four to six weeks after application and lasted for nine months and longer. The end-result is expected to be bigger yields of better quality.

Many research agencies are continuing to investigate the entire realm of mineral deficiencies including copper, zinc, cobalt, manganese, magnesium and other essential trace elements.

Those interested in the origin of the present work on mineral deficiencies should consult the publications of Stewart and Leonard (1) and Jacobson (2).

Geigy Company, Inc., Insecticide Division, are the exclusive sales agents for Sequestrene in the agricultural field. Write for technical bulletin, "Metal Complexes of Sequestrene* in Plant Nutrition", and pamphlets on iron chlorosis on citrus and reprints of papers by Stewart and Leonard, and Jacobson.

*"Sequestrene" is the registered trademark of the product of Alrose Chemical Co., A Geigy Company.

(1) Stewart, Ivan and Leonard, C. D. Iron Chlorosis — Its possible causes and control. Citrus Magazine 14(10): 22-25, 1952. (2) Jacobsen, Louis. Maintenance of Iron Supply in Nutrient Solutions by a Single Addition of Ferric Potassium Ethylenediamine Tetraacetate. Plant Physiol. 26(2):411-413, 1951.

ORIGINATORS OF Geigy DDT INSECTICIDES

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Aberdeen, N. C.; Burlington, Iowa; Colorado Springs, Colo.; Elkton, Md.; Fresno, Calif.; Houlton, Me.; Leland, Miss.; McGregor, Tex.; Orlando, Fla.; Walla Walla, Wash.

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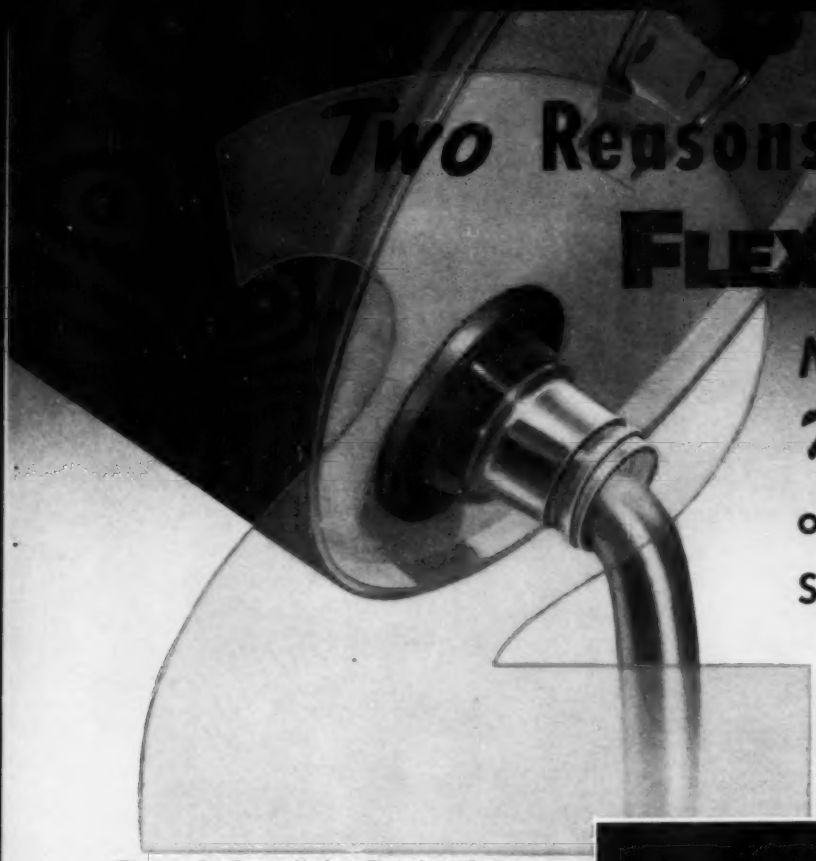

1

FLEXSPOUT Makes Pouring, Re-Sealing and Storing Your Products Easier Than Ever Before:

FLEXSPOUT can be opened with any pointed tool. The flexible spout eliminates muss and fuss in pouring and mixing. Re-sealing is simple and foolproof with the plastic screw-top. The spout retracts below the pail cover for easy stacking during storage.

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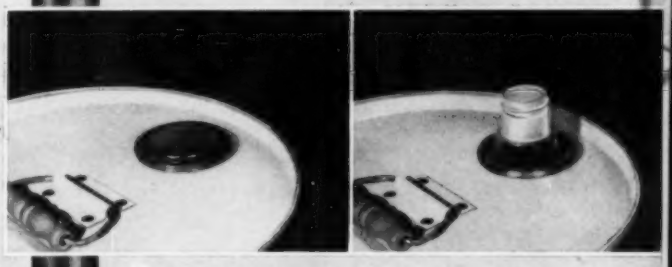
FLEXSPOUT Delivers Your Product In Better Condition:

It's the first really leak-proof pail closure ever developed. It seals directly on the pail metal . . . is actually stronger than the pail itself. Since only the chemical-resistant, nontoxic plastic touches the liquid, there's no chance for contamination.



SEE FOR YOURSELF!

Because words and pictures can hardly begin to describe this amazing new closure, we'll gladly send you a free sample for your inspection. Send for it today!

MAIL THIS COUPON *Today!*

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AUBURN, INDIANA

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We'd like to know more about the new FLEXSPOUT Closure
Please send us... ☐ Free Sample ☐ Brochure

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Choose a Standard Raymond Mill for INSECTICIDE GRINDING

RAYMOND IMP MILL

THE Raymond Imp Mill with Whizzer Separator is a compact unit that economically meets the requirements of small and medium size plants.

It is especially adapted for making blended field strength products and the lower concentrate formulations. The Imp Mill has no screens to break, wear out or clog. The air separation system, used for classifying and conveying, provides a cooling medium for removing heat generated in pulverizing. Lower mill temperatures permit greatly extended operating periods without shutdowns.

For detailed information on Raymond Mills for *insecticide grinding*, ask for Bulletin 68

RAYMOND ROLLER MILL

The Raymond Whizzer-Type Roller Mill is an all-purpose unit for handling the entire range of insecticide powders, including the regular field strength, high concentrate or sulphur.

It is a slow-speed, cool-running unit, capable of continuous 24-hour operation. Whatever your plant capacity or product specifications, there is a suitable Raymond Mill for the purpose.

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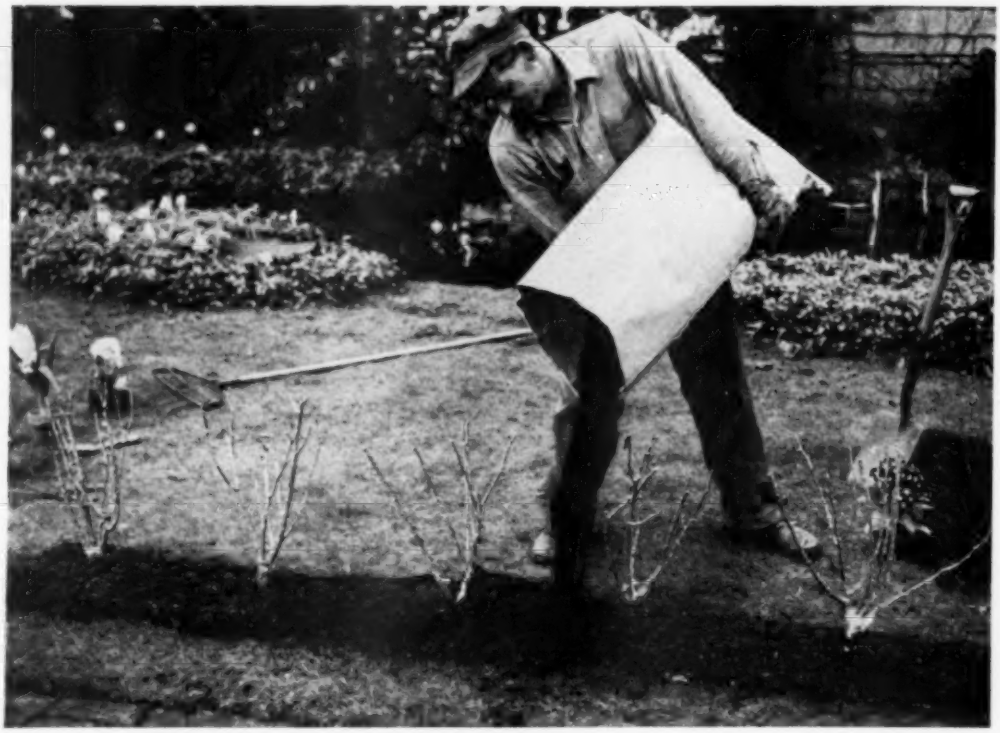

Now—for peat moss and humus: paper package that won't rot

made possible by coating of Du Pont ALATHON*

Coating of "Alathon" preserves paper from attack by moisture and micro-organisms

At last, producers of peat moss and humus can be sure their packaged product will *stay* packaged . . . in multi-wall bags coated on the inside with Du Pont "Alathon" polythene resin. This is a typical example of how "Alathon" can provide better packaging for so many different chemical products.

Before this bag lined with "Alathon" was developed, all conventional packages then being used sooner or later disintegrated because of moisture and micro-organisms in the peat moss.

The coating of "Alathon" inside this multi-wall bag cannot be harmed by micro-organisms—it slows vapor transmission—and the bag is stronger (drop-breakage tests proved it) than all other bags tested! What's more, it protects the peat moss or humus by keeping air out, moisture sealed in.

Coating of "Alathon" on packaging materials provide a unique combination of properties, offering new ways to meet many packaging needs in the agricultural chemicals industry. "Alathon" is tough, strong and scuff-resistant—chemically inert—tasteless, odorless, non-toxic—resists vegetable oils, acids, alkalis—stays flexible at 70°F. below zero!

. . . Write for free booklet describing the properties and uses of "Alathon" in the packaging field. We'll gladly put you in touch with sources of supply for packaging materials coated with "Alathon."

E. I. du Pont de Nemours & Co. (Inc.)
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*REG. U. S. PAT. OFF.

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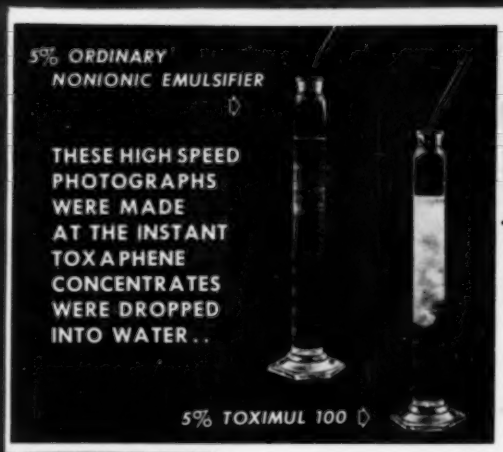
5% ORDINARY NONIONIC EMULSIFIER
THESE HIGH SPEED PHOTOGRAPHS WERE MADE AT THE INSTANT TOXAPHENE CONCENTRATES WERE DROPPED INTO WATER..
5% TOXIMUL 100

for

SPONTANEOUS DISPERSION

use

TOXIMUL

a balanced anionic emulsifier for agricultural insecticides

TOXIMUL is the family name of Ninol Laboratories' new series of Emulsifiers, designed to improve performance and reduce costs of biocidal spray concentrates. Various members of the series have been developed for use with different types of insecticides such as Toxaphene, Chlordane, DDT, etc.

TOXIMUL 100, for example, features *spontaneous dispersion* when used in Toxaphene emulsion concentrates. When added to water of any hardness, concentrates containing TOXIMUL 100 form stable emulsions with a minimum of agitation. Such concentrates are therefore ideal for general agricultural use, and particularly where agitation conditions are poor . . . as in aeroplane sprayers, knapsack tanks and cattle dips.

SEND THIS COUPON TODAY!

NINOL LABORATORIES, DEPT. A
1719 S. CLINTON ST., CHICAGO 16, ILL.

Gentlemen:

Please send me sample and further information about TOXIMUL emulsifiers. Our major product type is:

☐ Toxaphene ☐ Chlordane ☐ DDT
☐ (other) .....

NAME .....
TITLE .....
COMPANY .....
STREET & No. .....
CITY .....
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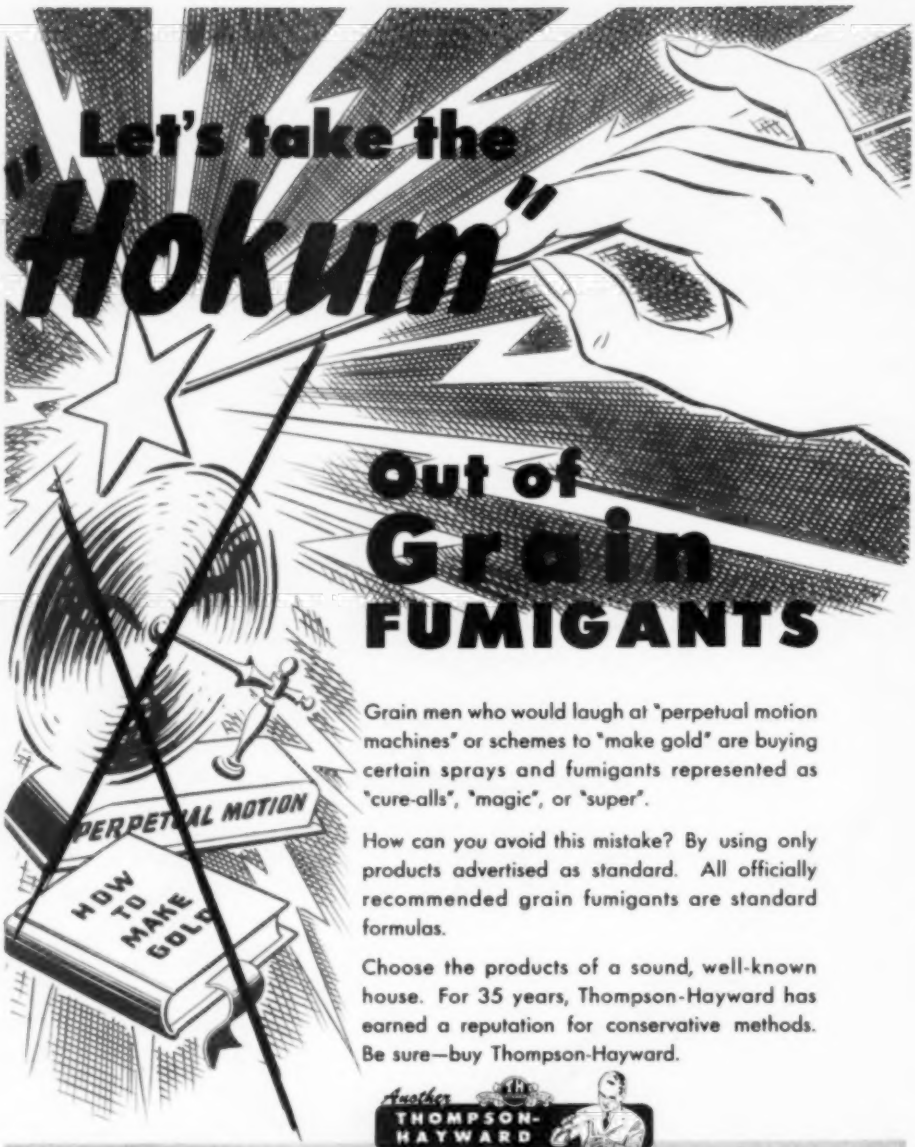
NINOL

Detergents — Emulsifiers

NINOL LABORATORIES

1719 S. CLINTON • CHICAGO 16 • PHONE CHESAPEAKE 3-9625

In Canada: Chemical Developments of Canada Ltd., 420 Lagauchetiere Street W., Montreal 1, Quebec



Grain men who would laugh at "perpetual motion machines" or schemes to "make gold" are buying certain sprays and fumigants represented as "cure-alls", "magic", or "super".

How can you avoid this mistake? By using only products advertised as standard. All officially recommended grain fumigants are standard formulas.

Choose the products of a sound, well-known house. For 35 years, Thompson-Hayward has earned a reputation for conservative methods. Be sure—buy Thompson-Hayward.

Another THOMPSON-HAYWARD Product

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1. STORAGE CONTROL—will not take or lump while in storage.

2. APPLICATION CONTROL—drills free and even . . . does not bridge over in the drill.

3. FOOD CONTROL-supplies uniform amount of plant food at desirable rates.

Davison's Granulated Superphosphate with 3-way control can mean added sales for you!

No longer is it necessary for you or the farmer to worry about lumping or caking . . . Davison's Granulated Superphosphate will store without becoming hard or caked. And when the farmer starts to apply Granulated Superphosphate in the field he will find there is no dusting nor will it bridge over in the drill. Granulated Superphosphate drills freely and evenly giving complete coverage. Because of the granular structure, plant food is released at desirable rates.

For added sales points be sure to get *Davison's Granulated Superphosphate with the 3-way control!*

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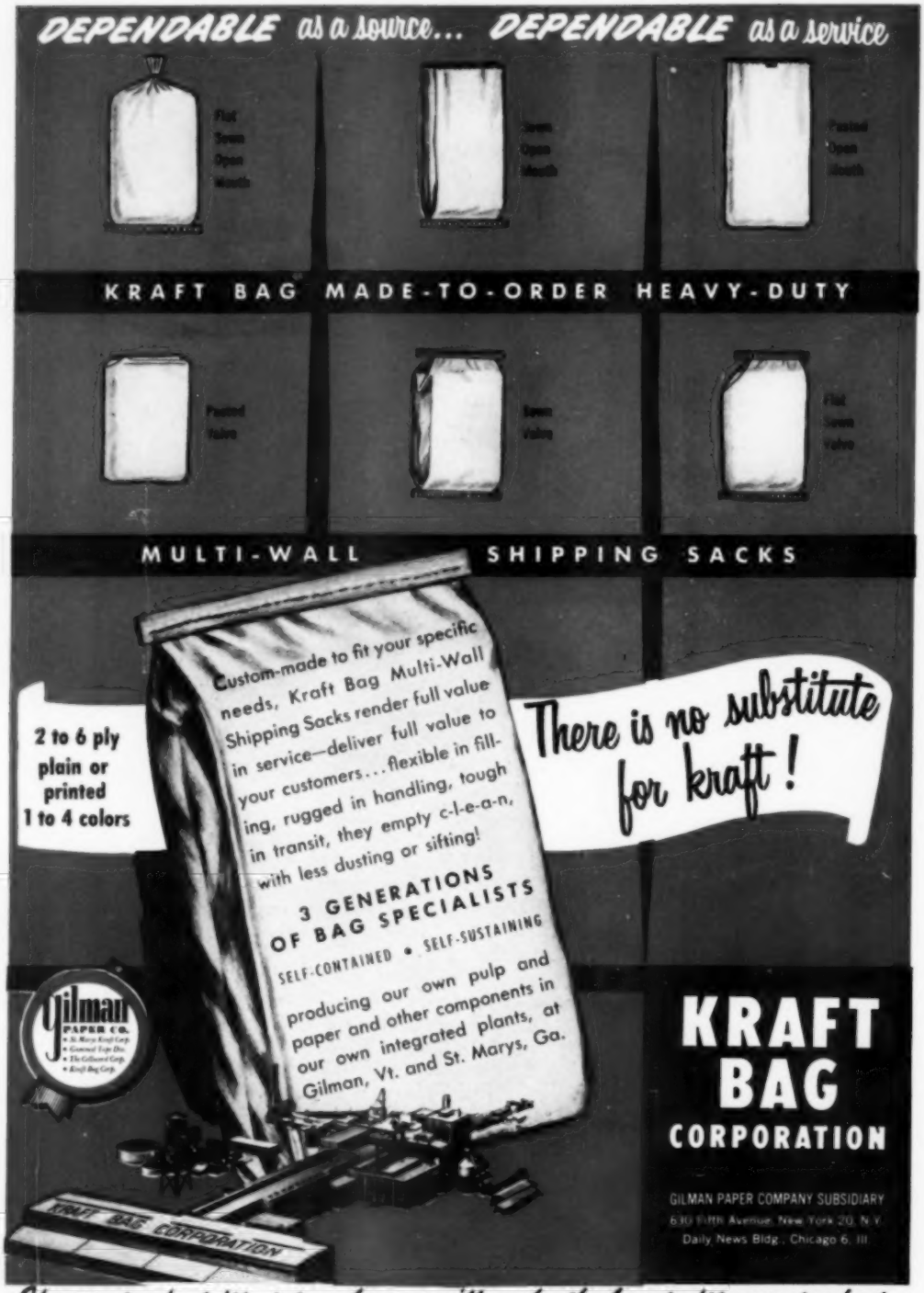
Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, SILICOFLUORIDES AND FERTILIZERS.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MULTI-WALL SHIPPING SACKS
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Custom-made to fit your specific needs, Kraft Bag Multi-Wall Shipping Sacks render full value in service—deliver full value to your customers... flexible in filling, rugged in handling, tough in transit, they empty c-l-e-a-n, with less dusting or sifting!
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producing our own pulp and paper and other components in our own integrated plants, at Gilman, Vt. and St. Marys, Ga.
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If your product fits into a bag — we'll make the bag to fit your product.

Partial aerial view of Naugatuck Chemical test fields and lab at Bethany, Connecticut

Here's where sales are sown!

Here's where Naugatuck chemicals begin—where Spergon®, Phygon® and Aramite* first showed signs of becoming the nationally famous products they are today.

Here's where Naugatuck Chemical's seed protectants, spray fungicides and insecticides of tomorrow must meet the tests of effectiveness, economy, plus ease and safety of use.

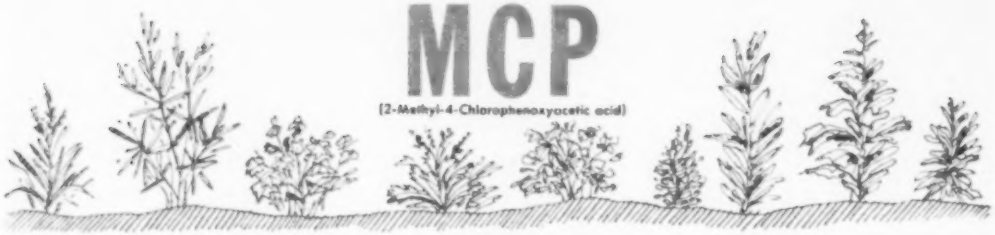
Yes, and here's where sales are sown! When the benefits of the Naugatuck chemicals developed here eventually reach the grower, they also reach the supplier and distributor in the form of new sales and new profits.

*U. S. Pat. No. 2,529,494

UNITED STATES RUBBER COMPANY

Naugatuck Chemical Division • Naugatuck, Connecticut

manufacturers of seed protectants – Spergon, Spergon-DDT, Spergon-SL, Spergon-DDT-SL, Phygon Seed Protectant, Phygon Nuggets, Phygon-XL-DDT, Thiram Nuggets – fungicides – Spergon Wettable, Phygon-XL – insecticides – Synklor-48-E, Synklor-50-W – fungicide-insecticides – Spergon Gladiolus Dust, Phygon Rose Dust – miticides – Aramite.



MCP

(2-Methyl-4-Chlorophenoxyacetic acid)

knocks out

101 kinds of weeds

with less injury to crops

Monsanto MCP (2-Methyl-4-Chlorophenoxyacetic acid) or (4-Chloro-*o*-toloxyacetic acid), an active ingredient for herbicidal formulations, has outstanding effectiveness against 101 weeds. It offers outstanding tolerance to certain crops.

MCP is a hormone-type weed killer. Its action is similar to 2,4-D. It is more effective than 2,4-D in controlling Canada thistle, white top and some members of the mustard family. It is less injurious than 2,4-D to flax, various grasses, cereal crops and legumes.

Chemical weed control is growing in acceptance at a rapid pace. Be prepared to supply your customers with this new, more selective, hormone-type weed killer next season. Place your contract now for Monsanto MCP and be *sure* of your supply. For information, contact the nearest Monsanto Sales Office, or write for a copy of the Monsanto Technical Data Sheet which fully describes MCP.

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2,4-D ACID
2,4-D SODIUM SALT
2,4-D ISOPROPYL ESTER
2,4,5-T ACID
2,4,5-T ISOPROPYL ESTER
IPC and CHLORO IPC
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SANTOCHLOR® (para-Dichlorobenzene)
SANTOPHEN 20 (Pentachlorophenol, Technical)
NIFOS®-T (Tetraethyl Pyrophosphate, Technical. For agricultural use only.)
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MCP

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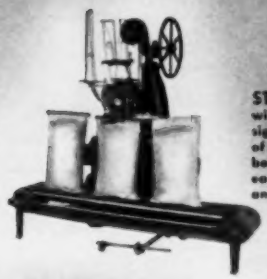
SERVING INDUSTRY... WHICH SERVES MANKIND

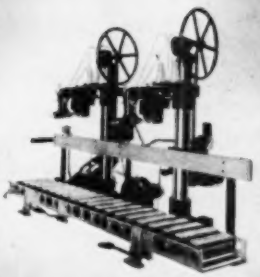
BAG CLOSING MACHINES *Engineered*



STYLE 21800 H *(Left)*, equipped with 80600 H sewing head, is designed for fast, economical closing of paper bags. Bag is sewed, tape-bound, and tape is cut off neatly at each end of closure. Sewing head and conveyor adjustable vertically.

CLASS 20500 *(above)* machines are heavy duty, high production units for closing medium and heavy weight bags. Available with power-driven horizontal conveyor, inclined conveyor, or both; or with conveyor transmission unit only, for plant production line.

STYLE 20100 H *(left)*, is a heavy duty, high production column type machine designed for use with plant conveyor systems. Sewing head is pedal controlled.



DUPLEX MACHINES *(right)* are designed for closing double bags. The first sewing head closes the inner bag; the second closes either the outer bag alone, or both bags together for extra safety. Also recommended for single closures where continuous operation is a must — operator can instantly switch to other head.

Union Special®

TO MEET MODERN PRODUCTION REQUIREMENTS!

No two jobs are exactly alike—that's why Union Special builds a wide variety of bag closing equipment. In the Union Special line you will find machines for closing all sizes and kinds of bags from small textile or paper bags of one pound, or less, up to the largest jute or multiwall paper bags in use today. And whether your schedule calls for closing just a few bags or for high continuous output, Union Special can supply the equipment to do the work efficiently, economically, dependably! FOR THE BEST IN BAG CLOSING EQUIPMENT, LOOK TO UNION SPECIAL. See your Union Special representative for recommendations, or write.

Ask for Recommendations

UNION SPECIAL MACHINE CO.
447 N. Franklin St., Chicago 10, Ill.

Gentlemen: Without obligating me, please furnish information on bag closing equipment to handle the following production:

Kind of bags used?_____

Filled weight of bag?_____

Material being packed?_____

Maximum bags per minute?_____

Check-weighing required?_____

Conveyor required on Machine?_____

Power: ☐ D.C., ☐ A.C., Volts_____

Phase_____ Cycles_____

Name_____

Company_____

Address_____

MACHINE COMPANY
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DDT

TECHNICAL DDT

DDT DUST CONCENTRATE

75% DDT WETTABLE POWDER

when you want it promptly

Check with Michigan Chemical for your continuous, fast supply of DDT. You can be sure of exceptionally high purity, uniform production, and prompt service.

Strategically located in the midwest agricultural area, Michigan Chemical is a basic producer of DDT for Agricultural use. This, together with favorable transportation facilities, assures you a most satisfactory source. Just as a trial, place your next order with Michigan Chemical. You'll get results that surpass promises.

MC

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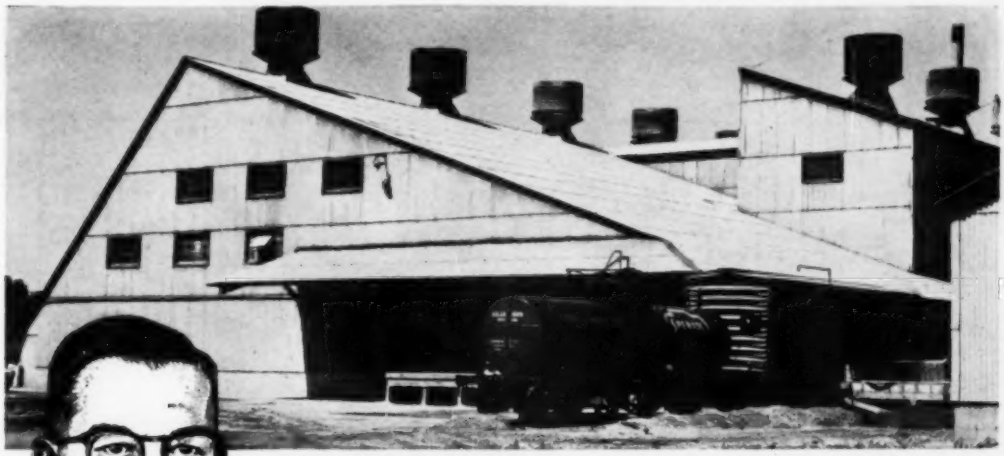
BASIC MANUFACTURERS OF INDUSTRIAL, PHARMACEUTICAL, AND AGRICULTURAL CHEMICALS



John Mark is Director of Production and Procurement for Iowa Plant Food Company who supply 45,000 tons of fertilizer to Iowa farms annually.

Fertilizer from this big plant at Des Moines helps to make rich Iowa farm lands still richer. Established in 1946, Iowa Plant Food Company expanded in 1949 with the plant you see here. Their high analysis mixed fertilizer and direct application materials are distributed in every county in Iowa.

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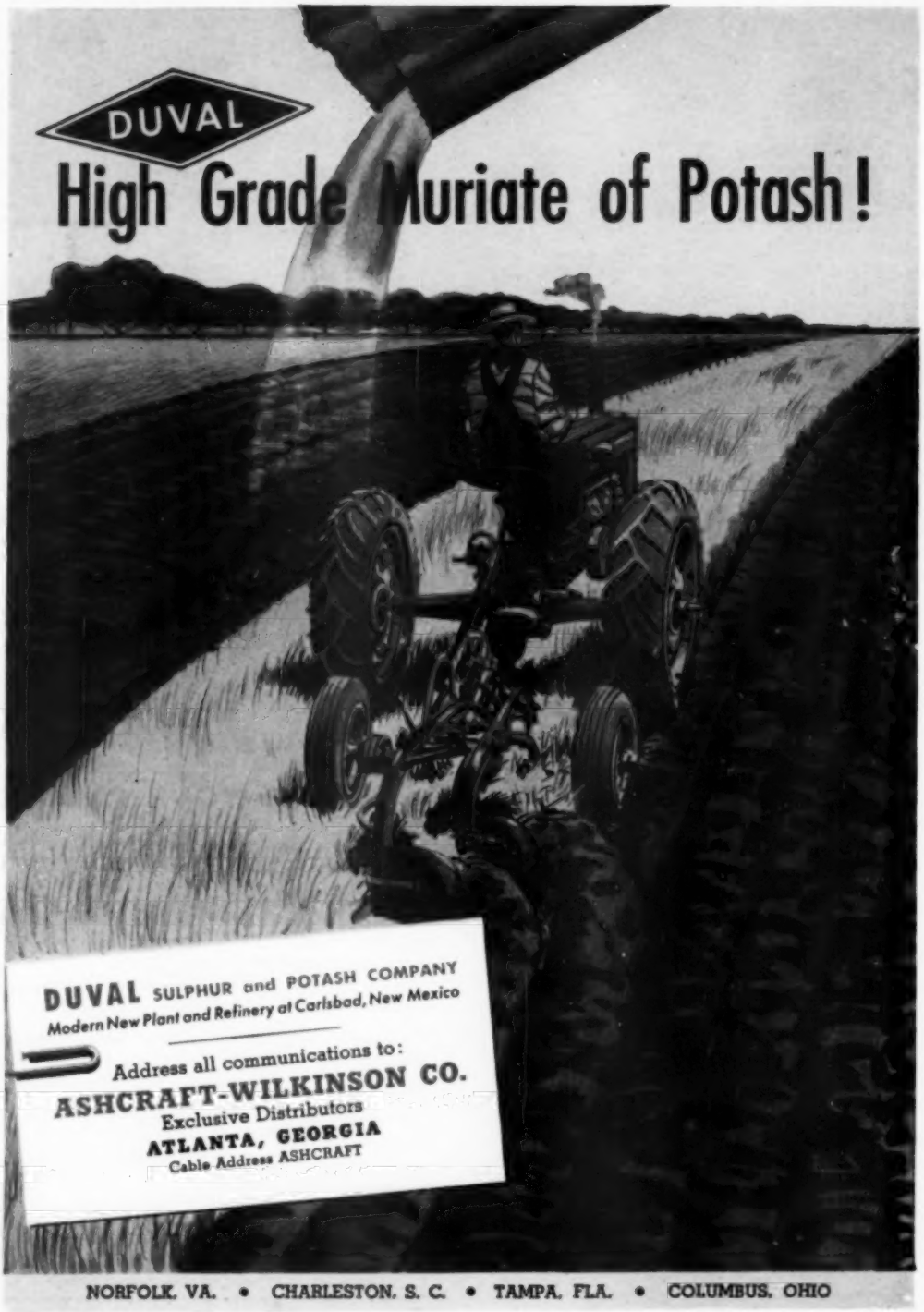
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THE EDITOR COMMENTS

SUGGESTIONS as to how the pesticides manufacturing industry might avoid recurrences of the chaotic conditions of the recent season were made by Lea S. Hitchner at the September meeting of the National Agricultural Chemicals Association. It seems to us that the three points he made should be placed before the trade for thoughtful consideration.

In the first place, Mr. Hitchner said, we need statistics; accurate data on production, inventory carry-over, credits, federal and state recommendations and other economic signposts now lacking in the pesticide industry. Many other industries, he pointed out, have comprehensive statistical services to guide their members, usually conducted through trade associations. In the case of the pesticide industry, it was emphasized, the NACA "stands ready" to perform this service if the industry wants it and will cooperate to the extent of furnishing the necessary data.

The second point deals with education of users on safe methods of handling and application. "While many of our companies are doing excellent educational jobs . . . . there is need for a better coordinated effort on this important matter," he said. Unless this is done, it leaves the way wide open for misguided critics to curtail seriously, the use of many materials. There could certainly be no doubt of the accuracy of this observation in the light of events of the past couple of years.

New markets for pesticides should and must be found. An organized attempt to develop such markets would be likely to uncover possibilities for pesticide use far in excess of practices now generally recognized Among the fields presently ripe for greater attention are the grassland program; the stored grain program; the forest pest control programs; and the world export market.

Industry should not be content merely to follow promotion efforts by various state and federal agencies. The same efforts should be put forth by industry to develop these new markets, as was done in the past to sell the cotton grower on insect control; the cereal grower on weed control; the fruit and vegetable grower on all phases of pest control.

It can be done, but not completely without the bulk of the industry pitching in strongly.

IN keeping with the fertilizer industry's emergence into a major chemical manufacturing enterprise, is its recognition of a need for higher safety standards. Not too long ago, the fertilizer trade was regarded by the general public as a sort of scavenger industry, but now many of its factories are huge chemical processing plants. Mixing plants, too, have improved their methods through mechanization, which makes it imperative that safety programs should be initiated in factories both large and small.

Later this month, October 22 and 23, the fertilizer industry is to meet in Chicago for an important session to discuss problems involved in achieving a better safety record. Speakers from widely separated localities will present ideas for cutting down accident rates and an explosives expert is slated to demonstrate multiple-shot blasting in a fertilizer plant to illustrate a less hazardous means of reducing caked materials into workable shape.

Adding it all up, the safety program seems to be well worth the time and trouble in attending the October meeting. Every plant in the industry has a stake in greater safety, not only from the standpoint of reducing human pain, but from a business viewpoint as well. Safe operations mean more efficiency, lower compensation insurance rates, and the ability to attract a better class of workmen. It all amounts to improvement all the way down the line in operations both large and small.

We hope every fertilizer manufacturer will have at least one representative at the Sheraton Hotel come October 22!

Methoxychlor, DDT, CS-708 and Dieldrin—Their Rates of

Excretion in Milk

SINCE the discovery by Howel et al. (4) that DDT was excreted in the milk of cows sprayed with this insecticide, many studies have been made to determine the rate of excretion of this insecticide in the milk and the duration of the milk contamination following spray treatments. Less work has been done on the other chlorinated hydrocarbon insecticides, because they have not been used so extensively on livestock or because methods of analyses were not available which could compare in sensitivity with the method for determining DDT (Schechter et al. 8).

At the Kerrville, Texas laboratory of the Bureau of Entomology and Plant Quarantine, enough data have been accumulated for comparison of the typical rates and duration of excretion after one spray treatment with 0.5 percent of DDT, methoxychlor, dieldrin, and CS-708.

The concentration of 0.5 percent is practical for DDT, methoxychlor, and CS-708, but is not the practical dosage for dieldrin. If dieldrin should be used on livestock, it would no doubt be sprayed at a much lower concentration than was employed in these experiments. It was tried at 0.5 percent concentration in order that rates of excretion could be compared.

Although the excretion of DDT in milk following treatment of commercial dairies was studied in 1949 (Claborn et al. 3), this work has been repeated in order that the method of treatment, amount of spray used per animal, and concentration of the spray would be uniform for all four materials.

Carter et al. (1) found that the presence of methoxychlor in milk following spray treatments could not be shown definitely by the organic-chlorine method of analysis, which at the time of their study was the only method available. The development of a sensitive colorimetric method by Prickett et al. (7) made it possible to determine more precisely amount of methoxychlor excreted in milk.

The cows used in this experiment were good-grade Jerseys in full lactation. They were sprayed all over, 2 quarts of spray being used for each cow. They were milked by machine, and the samples were taken from the full yield. Extreme care was taken at all times to avoid mechanical contamination of the milk. Since all these materials are fat-soluble and are known to be present only in the butterfat of milk, the butterfat of each sample was determined, and for purposes of comparison the results shown in the tables have been calculated and adjusted to a uniform butterfat content of 4 percent. The milk samples were taken before spraying and at various intervals after spraying. Procedure:

DDT. Three cows were sprayed with a 0.5 percent suspension of a DDT wettable powder. Milk samples were analyzed by the method described by Schechter et al (8).

Dieldrin. One cow was sprayed with a 0.5 percent dieldrin emulsion. The milk samples were analyzed

TABLE I
Parts per Million of DDT in Milk Following One Spray Treatment with 0.5 Percent of DDT.

Days	Cow No. 1	Cow No. 2	Cow No. 3
Before spraying	0.1	0.2	0.1
After spraying			
2	3.8	3.0	1.8
7	1.1	2.0	1.2
14	0.5	0.5	1.0
21	0.4	0.4	0.9
Average	1.4	1.5	1.2

[1] Report of a study made under the Research and Marketing Act of 1946. This experiment was conducted under a cooperative agreement between the U. S. Bureau of Entomology and Plant Quarantine, U. S. Bureau of Animal Industry, Texas A. & M. College. The studies on dieldrin were made in cooperation with the Julius Hyman Company and those on CS-708 with the aid of the Commercial Solvents Corporation.

by

H. V. Claborn
and
R. W. Wells

U. S. Department of Agriculture
Agricultural Research Administration
Bureau of Entomology & Plant Quarantine
Washington 25, D. C.

by the organic-chlorine method described by Carter (2), and the dieldrin was calculated from the organic chlorine found.

Methoxychlor. One cow was sprayed with a 0.5 percent methoxychlor emulsion and another cow with the same concentration of a wettable-powder suspension. The excretion of methoxychlor had reached zero at the end of 21 days, and the test was repeated on the same two cows. The milk samples were analyzed by the method described by Prickett et al. (7), which is sensitive to 0.05 p.p.m. on a 100-gram milk sample.

CS-708. Two Jersey cows were sprayed twice 14 days apart with 0.5-percent suspension of CS-708. A third untreated cow was used for a control. Milk samples were collected at intervals, and the samples were analyzed by the method described by Jones and Ridick (5, 6) and modified by Cundiff (unpublished).

The results are summarized in tables 1 to 3. The excretion of DDT in milk had been shown previously to reach a peak 2 days after spraying (3). Results here indicate that excretion of methoxychlor and CS-708 also reaches a peak 2 days after treatment, but that the peak for dieldrin is reached on the third day.

Milk samples taken from the three cows sprayed with DDT 2 days after treatment averaged 2.8 p.p.m.; the samples taken 21 days after treatment averaged 0.6 p.p.m.; and the average of all samples collected from the three cows over the 21-day period was 1.4 p.p.m.

The four samples collected from the two cows sprayed with methoxychlor 2 days after spraying averaged 0.4 p.p.m., and all were practically zero after 14 days. The average of all samples analyzed over the 21-day period was 0.19 p.p.m.

The milk from the cow sprayed with dieldrin contained 7.0 p.p.m.

(*Turn to Page 115*)

TABLE II
Parts per Million of Dieldrin and Methoxychlor Found in Milk from Cows Sprayed with 0.5 Percent of These Insecticides.

Days	Dieldrin	Methoxychlor	
		Emulsion	Suspension
Before spraying	0	0	0
After spraying			
1	2.9	.70	.25
2	5.5	.48	.44
3	7.0	.37	.33
4	3.8	—	—
5	—	.18	.19
7	1.7	.09	.16
10	—	.06	.05
14	1.3	.06	.05
21	0.4	0	0
Resprayed			
1	—	.33	.30
2	—	.40	.38
3	—	.30	.33
5	—	.18	.15
7	—	.09	.14
10	—	.06	.06
14	—	0	.06
21	—	0	0
Average	3.2	.20	.18

TABLE III
Parts per Million of CS-708 Found in Milk from Cows Sprayed with 0.5 Percent of CS-708.

Days	Cow No. 2	Cow No. 3
Before spraying		
1	0	0
Same day	0.06	0.07
After spraying		
1	.45	.77
1	.70	.80
3	.52	.83
7	.92	.26
10	.74	.33
14	.62	.44
Resprayed		
1	.64	.65
2	.96	1.26
3	.90	1.01
7	1.07	.92
10	.52	.47
14	.40	.30
21	.20	.20
Average	.66	.63

A Visit With the California Fertilizer

A RECORD of nearly 30 years of service to west coast agriculture has been set by the California Fertilizer Association which holds its annual convention November 10-12 at the Desert Inn, Palm Springs, Calif.

Because of the importance of this group of fertilizer people to the over all production of plant food in the United States (California agriculture consumed 731,400 tons of fertilizer last year), *Agricultural Chemicals* paid a visit to the association offices in Los Angeles, and with executive secretary and manager, Sidney H. Bierly, visited as many representative companies as possible in the limited time available.

In well-appointed executive offices, dusty plants, atop lofty stacks of fertilizer materials, on loading docks, in granulating rooms and just about every other nook and corner of dozens of fertilizer plants, this magazine's representative climbed about, taking pictures, interviewing managers and filling up a couple of notebooks with hasty scribbles.

Photo above: Trucks loaded with bagged products from Downey Fertilizer Co.

Top, left: Sidney H. Bierly, executive secretary and manager, CFA.

Center, left: Three charter members of CFA: T. Walter Houser, Southern Calif. Fertilizer Co., Los Angeles; Weller Noble, Pacific Guano Co., Berkeley; and George Bloxham, Pacific Guano Co., Los Angeles.

Lower, left: Ned Lewis, Wilbur-Ellis Co., Los Angeles.

A near-by plant, that of Parco, Inc., was the first stop, where president E. Thacher and vice-president and treasurer John J. McGrath were found busily studying sales reports. This company specializes in citrus and field crop fertilizer materials, handles poultry concentrates and operates a large wholesale business. Messrs. Thacher and McGrath say that they have no trouble at all finding enough to do in keeping the operation moving along.

Headquarters of the Downey Fertilizer Co. are at Downey, Calif. and a visitor at this busy place is likely to find its seven partners well occupied with their specialized jobs. These seven, Charles Monoogian, Ben, Sam, and Roy Moosechekian, Arthur and Arnold Babajian and Fred Nemoede carry the responsibility for different phases of the business, sales, office management, accounting, and production of "Red Star" brand materials. In the spacious yard of the first are two tremendously-large heaps of manure, one from dairy cows; the other from steers. Chemical analyses of the two differ, since the animals are fed different diets. The manure is brought in from the stock yards, and

Ass'n

is cured out-of-doors. Measuring more than an eighth-mile around, the stacks of dried material are handled by a fleet of bulldozers which swarm over the piles like ants on an elephant. (see photo, page 32)

Downey has a branch plant in Whittier, California, serving the area adjacent.

Another Los Angeles plant with a branch upstate, is the Plant

Upper right (left to right): Former C F A president Weller Noble, T. Walter Houser, Wallace Macfarlane, Pacific Guano Co., Los Angeles; and J. M. Quinn, Calif. Sun Fertilizer Co.; with current president, S. B. Tatem, Swift & Co., Los Angeles.

Second row (L. to R.): M. E. Martin, Leffingwell Chemical Co., Whittier; Joseph W. Kinsman, Leffingwell; Wayne Schoek, Inland Fertilizer Co.; Fred R. Little, Globe Fertilizer Co.; Mr. Houser; Mr. Noble; and Mr. Quinn. (Second photo, L. to R): Wallace Macfarlane; Ernie Hanson, Simplot Fertilizer Co., Pocatello, Ida.; Howard G. Conley, Pacific Coast Guano; Mr. Tatem; Mr. Bierly; R. J. Finch, Naco Fertilizer Co. and Mr. Bloxham.

Third and fourth rows: (1st photo) in office of Bandini Fertilizer Co.: Norman A. Springer, sales manager; Jack Baker, treasurer; Byron Reyolds, president and Byron (Bob) Reynolds, Jr., sales promotion manager. (Second photo) Clarence Bersche, plant superintendent, watches as bulldozer pushes material onto screen. Fourth row: views of bagging and shipping departments respectively, at Bandini.

Lower row: Loading a truck at Calif. Sun Fertilizer Co., Los Angeles. CFA's new emblem on display in offices of all members. Jim Quinn, president, Calif. Sun Fertilizer Co., at desk.

Food Corporation. This firm, organized in 1929, not only survived the lean years following, but is now a thriving business with a branch in Bakersfield which operates under the same name. John E. Campbell is president of the concern and Gordon Everett, manager of the branch. The Los Angeles plant manufactures fertilizer materials and a complete insecticide line as well. The branch handles only fertilizer materials.

A small but prosperous operation is that of the West Coast Rendering Co. of which Joseph E. Fendel is president and Perry A. Silverman, secretary-treasurer. This firm has discontinued use of fabric bags, according to Joseph Fendel, Jr., who showed the reporter around the plant, and is now doing all of its packaging in multiwall paper bags. It was indicated that this was of benefit to both the customer and the manufacturer as well.

Bandini Operations

CONSIDERABLE time was spent inspecting the Bandini Fertilizer Co. in Los Angeles. This firm, founded in 1926 by T. S. Reynolds, father of Byron Reynolds, president, has expanded greatly over the years. Occupying originally only a single acre of land, the plant now covers six acres. A considerable portion of this area is utilized for storage of piles of dried manure.

With Byron Reynolds, Jr. as guide, the reporter was shown the plant from office to loading dock. Mr. Reynolds, Jr., in charge of sales promotion and public relations, introduced T. S. Reynolds, vice-president; Jack Baker, treasurer, and Norman A. Springer, sales manager in the office, and Clarence Bersche, plant superintendent, hard at work overseeing the operations out-of-doors.

The firm makes fertilizer for both farm and garden use and mixes different grades for "problem" application, such as materials for horticulture. Recently the firm expanded its line to include insecticides and now markets a chlordane product, "Kil-Rite" to complement its fertilizer counterpart, "Gro-Rite." A new plant was built in 1946 and it is entirely mechanized. Six salesmen represent the company whose products are sold over a wide area of southern California.

An interesting history lies back of the Inland Fertilizer Co. In September 1918, Grover C. Dunford began the business by mixing small amounts of fertilizer with shovels and selling house to house. This developed into the use of a barrel mixer, operated first by man, then a larger one.

Photos across top: scenes at Downey Fertilizer Co., Downey, Calif.: loading truck with bagged goods and bulldozing huge mound of fertilizer raw material.

Second photo (left): Wm. H. Ramsey, president, C. M. Volkman & Co., San Francisco; Harold Ferguson, vice-president, Naco Fertilizer Co., San Francisco; and Mr. Bierly.

Third & fourth pictures: Office and plant, respectively, of Pacific Guano Co., Los Angeles;

Lower two photos: Plant and office, respectively, of Swift & Co., Hayward, Calif.

rotated by a horse. Successively, a gasoline engine succeeded the horse; a small building replaced the open-air "factory;" and later still, in 1931, a much larger factory building and separate office (both still in use) were added. Today, the company is doing a steady business. President Grover C. Dunford and his sons, G. Park and Jack L., sales manager and production manager, respectively, appear to be upholding the long tradition of constant progress for the company.

Formerly associated with the Inland Company but now an individual entity, is the Globe Fertilizer Co., also Los Angeles. Head of this firm is Fred R. Little, president and general manager, and his son, Paul, vice-president and assistant manager. The firm has been in business for itself for the past 20 years and specializes in garden and ornamental mixtures. Son Paul, in addition to the "know how" picked up from close association with his father in the business, holds a degree in sub-tropical horticulture from the University of California, Los Angeles.

Pacific Guano Prominent

PROMINENT in the Los Angeles plant food picture is the Pacific Guano Co.'s branch at L. A. Here George Bloxham, once retired, has been brought back into active participation as manager upon the recent advancement of Howard G. Conley, now assistant general manager of the California operations, with headquarters at Berkeley. President of Pacific Guano is Weller Noble, first president of the CFA, formerly chairman of the board of the National Fertilizer Association and still a board member of NFA. Mr. Bloxham has served with distinction also, being a charter member of the California Fertilizer Association and holding an almost unbeatable record of having attended every CFA convention for 27 straight years. (Yes, he expects to be on hand at the Palm Springs meeting.)

Dr. Wallace MacFarlane, also a former CFA president, is vice-president in charge of the firm's liquid fertilizer division, Los Angeles, and F. E. Frasier is sales manager, at Los Angeles. (In Berkeley, Ralph Crum is vice-president and Lisle Garner is sales manager).

P. G. markets a number of fertilizer mixtures both for citrus and row crops, in California, as well as for crops in the Salt River Valley in Arizona. Three mixtures are most popular in the former category: 8-8-4; 6-9-6; and 10-10-5. For the latter, the most important grades are 10-20-0; 10-10-0; and 17-7-0.

Top photo, (L. to R.): The Dunfords of Inland Fertilizer Co., Los Angeles; Park, Grover C. and Jack.

Second photo: John E. Campbell and M. W. Mothershed, Plant Food Corporation, Los Angeles.

Third photo: John J. McGrath, vice-president and treasurer and E. Thacher, president, Parco Inc., Los Angeles. Howard G. Conley, Pacific Guano Co., Berkeley.

Fourth row: Loading bagged fertilizer at Best Fertilizer Co., Oakland, Calif.

Fifth row: Inside Swift & Company's laboratory, Los Angeles.

Across bottom of page: Aerial view of Best Fertilizer Co. plant in Oakland. Much of the plant is new, the factory having been leveled by a fire two years ago.

Wilbur-Ellis Busy Place

A LOS ANGELES firm with world-wide interests, is the Wilbur-Ellis Company. Ned Lewis, long prominent in CFA affairs, is vice-president in charge of all agricultural activities. Since these activities include mixing, blending and importing of insecticides ten months of the year, Mr. Lewis' interests are more broad than the fertilizer industry itself.

In explaining briefly the operations of the company, Mr. Lewis says that it was established in 1923 and has developed to the point where it now carries on much foreign trade, particularly with Peru and Japan. Fifteen offices are maintained by the company throughout the world, including, of course, the Orient and South America, as well as branches in the U. S.

Agricultural activities stem from southern California where they started for Wilbur-Ellis in 1925. In the early 30's, mixing and blending plants were established and now plants are located in San Diego, Fresno and Los Angeles in California, and at Phoenix and Yuma in Arizona.

A subsidiary fertilizer company, Arizona Agro-Phosphate, makes liquid solutions for direct application to the soil or application through irrigation water.

Two Swift Plants

SWIFT & Company's Plant Food Division operates two plants in California; one in Los Angeles and the other at Hayward in the San Francisco-Oakland area. The former plant is managed by S. B. Tatem, currently president of the California Fertilizer Association. Mr. Tatem spends a great deal of time and energy in the interests of the Association activities as well as attending to the affairs of his own business.

The Swift plant in Los Angeles is completely modern, with mechanical material-handling equipment and fume-arrestors throughout. Housed in a new building, the plant produces its chemically mixed products very efficiently. Bagged plant food is shipped out both by truck and by rail.

In conjunction with the fer-

(Turn to Page 99)

John L. Ross, Indio, California, dealer of the Liquinox Co., (left) and Gordon X. Richmond, partner in the firm, with tank of liquid fertilizer.

Photos at left: W. L. Dixon, Jr., general manager, Best Fertilizers Co., Oakland, Calif., and Lowell W. Berry, president, Best Fertilizers Co. Their company has announced plans for construction of a $1.7 million fertilizer plant near Stockton, Calif., to make both liquid phosphoric acid and pelleted fertilizers.

Charles Monoogian (L) and Sidney H. Bierly pick oranges in Mr. Monoogian's lush grove adjacent to his new home not far from Los Angeles. Mr. Monoogian is a partner in the Downey Fertilizer Co., Downey, Calif.

NAC Association Discusses Exports, Toxicity, Legislation,

New Pesticide Markets

IN its nineteenth annual meeting held September 3-5 at the Essex and Sussex Hotel, Spring Lake N. J., the National Agricultural Chemicals Association counted an attendance of more than 500 members and guests which taxed the facilities not only of the Essex and Sussex, where all of the meetings were held, but also of the adjacent Monmouth Hotel.

The group re-elected as president, Arthur W. Mohr, president, California Spray Chemical Corp., Richmond, Calif. The other officers were also re-elected as follows: Paul Mayfield, general manager of the Naval Stores Dept., Hercules Powder Co., Inc., Wilmington, Del., vice-president; and Lea S. Hitchner, Washington, D. C., executive secretary and treasurer. Elected to serve as members of the NAC board of directors, were fifteen association members as listed below.

President Mohr, in his annual address on the first day, led off the program which included speakers representing the U. S. Department of Agriculture, Land Grant Colleges, Fish and Wildlife Service of the Department of Interior, the farm press and the manufacturing industry.

Mr. Mohr reviewed the supply and demand picture of the past year, stating that within that time, the manufacturing capacity of the industry has increased to nearly double the production potential of any previous year.

While production was up, there was trouble in a reduced demand for pesticidal products, aggravated by export regulations which prevented the industry from shipping out much of the material on hand. Light insect infestations, particularly in the south, were another contributing factor in the oversupply picture, he said. These conditions, plus the drought in many important parts of the country, resulted in the "greatest inventory surplus and carry-over problem in the history of this business." This situation, he said, should mean that there will be no strain on the industry's facilities to handle the 1953 requirements.

In setting forth a policy to correct the situation, the NAC president offered two suggestions. In the

Photo, below: officers and board of directors. — NAC Association — 1952-53. Standing: (Left to Right): E. H. Phillips, James McConnon, Russel B. Stoddard, August Petrus, Ernest Hart, Paul Mayfield (vice-president), Byron P. Webster, and J. Hallam Boyd.

Sitting: (Left to Right): F. W. Hatch, W. W. Allen, Arthur W. Mohr (president), John Paul Jones W. C. Bennett George F. Leonard and L. S. Hitchner (Exec. Secretary).

Other members not in picture: Fred Shanaman and J. M. Taylor

first place, he said, the industry should work for complete relaxation of export quotas, and second, members of the industry should try to create an expanded use of its products. "There is a vastly increased market open to us if we will sell all potential users on the sound economic gain we have to offer in the use of our products. A strong wide-spread educational sales job needs to be done. Such a program should help to solve the oversupply problem."

As a help toward preventing recurrence of such a situation, Mr. Mohr indicated that if information on the state of inventories were available, "Industry could then work more intelligently to supply fully the needs of domestic agriculture and the foreign market and at the same time not overproduce by such tremendous margins." He pointed out the apparent reticence on the part of industry members to furnish information about inventories and amounts of materials manufactured, and declared that "it is now becoming quite generally felt that information of this type is sorely needed for better planning." He termed as "highly advisable," adoption of a system of reporting similar to that in effect on the manufacture of certain chemicals, in operating defense agencies. To

In the Photos:

Top to Bottom, Left to Right: Jack W. Moore, Floridin Co., Warren, Pa.; Dr. Bruce Gleissner, American Cyanamid Co., New York.

Second photo: Len Gopp, Detroit, Mich.; and G. E. H. Marshall, United Nations, New York.

Third picture: E. C. Gerdes, Geigy Co., Inc., Burlington, Iowa. Will the gent on the left please come forward and identify himself? Looks like E. N. Woodbury of Hercules Powder, but it isn't.

Fourth photo: Ed. J. Geise and Jack Watson, both of J. M. Huber Co., New York.

Fifth picture: C. O. Eddy, Niagara Chemical Division and George F. Leonard, executive vice-president, Tobacco By-Products & Chemical Corp., Richmond, Va.

Lower photo: Dr. W. E. Dove, U. S. Industrial Chemicals Co., New York; Avery S. Hoyt, chief, Bureau of Entomology and Plant Quarantine, U. S. D. A., Washington, D. C.; L. G. Matthews, American Smelting & Refining Co., New York; and Mark M. Biddison, General Chemical Division, Allied Chemical & Dye Corp., New York.

Board Members Elected

Those elected to the NAC Association board of directors for terms of one to five years are as follows:

W. W. Allen, Mgr., Agricultural Chem. Sales, The Dow Chemical Company, Midland, Michigan.

W. C. Bennett, Pres., Phelps Dodge Refining Corp., New York, N. Y.

J. Hallam Boyd, Exec. Vice-Pres., Commercial Chemical Co., Memphis, Tennessee.

F. W. Hatch, Vice-Pres. and Manager, Julius Hyman Div., Shell Chemical Corp., New York, N. Y.

John Paul Jones, Asst. to Gen. Mgr., Stauffer Chem. Co., New York, N. Y.

G. F. Leonard, Exc. Vice-Pres., Tobacco By-Prod. & Chem. Corp., Richmond, Virginia

Paul Mayfield, Gen. Mgr., Naval Stores Dept., Hercules Powder Co., Inc., Wilmington, Delaware.

James McConnon, Vice-Pres., McConnon & Company, Winona, Minnesota.

A. W. Mohr, Pres., California Spray-Chemical Corp., Richmond, Calif.

August Petrus, President, Cotton States Chemical Company, Inc., West Monroe, La.

E. H. Phillips, Dir. of Purchasing, GLF Soil Bldg. Service, Div. of Coop. GLF Exchange, Inc., New York, N. Y.

Fred Shanaman, Pres., Pennsylvania Salt Mfg. Co. of Wash., Tacoma, Wash.

Russell B. Stoddard, Coor. of Insecticide Operations, U. S. Industrial Chemicals Co., Div. of National Distillers Prod. Corp., New York, N. Y.

Byron P. Webster, Vice-Pres., Chipman Chemical Co., Inc., Bound Brook, N. J.

J. M. Taylor, Pres., Taylor Chemical Co., Aberdeen, N. C.

The immediate past president, Ernest Hart, vice-president of the Food Machinery and Chemical Corportion, San Jose, Calif., and Lea S. Hitchner, are ex-officio members of the board of directors.

assure the smooth working of such a plan, however, complete cooperation of a "very large majority" of the industry is necessary.

Mr. Mohr's report covered the Delaney Committee's recent recommendations, a plea for the issuance of tolerances on food by the Federal Food and Drug Administration and a brief discussion on product liability. The problem of traffic and transportation was also discussed, with the president pointing out the necessity of maintaining the favorable freight rates now enjoyed by the industry. He also covered state legis-

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In The Photos

Tow row (L to R): J. E. Bussart, Velsicol Corp., Chicago; S. L. Calhoun, Agricultural Chemical Co., Greenville, Miss.; M. M. Darley, Roger Roth, and C. C. Jennings, General Chemical Division, Allied Chemical & Dye Corp., New York; and Dr. H. G. Walker, Pennsylvania Salt Mfg. Co., Philadelphia. Speakers at morning session: president A. W. Mohr; Dr. Clair R. Spealman; Paul Mayfield; Dr. G. D. Humphrey; Dr. Paul D. Sanders and W. A. Minor.

Second row: C. Bruce Rennie, Tobacco By-Products & Chemical Corp., Richmond, Va.; Richard Yates, Hercules Powder Co., Wilmington, Del.; and W. R. Peele, W. R. Peele Co., Clayton, N. C.; A. J. Garvon, Jr., Shell Chemical Corp., Houston, Texas; Pat Wilson, Reason-Hill Corp., Jacksonville, Ark.; Louis Taylor, Stauffer Chmical Co., New York; and J. F. White, Julius Hyman Division, Shell Chemical Corp., Denver.

Third row: W. P. Marsh, Jr., U. S. Industrial Chemicals Co., New York; John Stoddard, John Powell Chemical Co., New York; Mrs. Stoddard; and Ed. A. Georgi, United Cooperatives, Inc., Philadelphia. Lea S. Hitchner and Oris V. Wells, Washington, D. C.

Fourth row: C. L. Barber, Dr. L. V. Sherwood, C. F. Zorsch, R. R. Wangerin, and A. G. Rossow, all of Monsanto Chemical Co. Melvin Goldberg, Penticide Advisory Service, New York; Mrs. Raoul Allstetter; and Mr. Allstetter, National Fertilizer Assn., Washington, D. C.

Fifth row: Jack Hewitt, Lebanon Chemical Co., Lebanon, Pa.; Mrs. Hewitt; Bill Merrit, Asheraft-Wilkinson Co., Atlanta, Ga.; Mrs. George Simches; and Mr. Simches, Planters Chemical Corp., Norfolk, Va.

Sixth row: Mr. Hitchner, Dr. L. Gordon Utter, Phelps Dodge Refining Corp., New York; Lee Grobe, NAC office, Washington D. C.; and Douglas Bennett, Phelps Dodge Refining Corp. W. W. Allen, Dow Chemical Corp., Midland, Mich.; J. Newton Hall, Pioneer Chemical Associates, Denver, Colo.; C. P. Zorsch; and R. M. Ferguson, Dow Chemical Co.

Seventh row: Dr. George C. Decker, Urbana, Ill.; M. J. Bunnell, Geigy Co., Inc., New York; and John Rodda, U. S. Industrial Chemicals Co., New York. Cy Haas, Attapulgus Clay Co., Philadelphia; Dr. P. D. Peterson, Stauffer Chemical Co., New York; and Ed. Georgi.

Bottom row: Richard Barton, Richard Porter, Bruce Crane and Paul Harris, all of Ethyl Corp.; Ruth Palmer, NAC staff, Washington, D. C.; P. J. Reno, Hercules Powder Co.; Henrietta Monigle, Hercules Powder Co.; Dr. Humphrey; Charles S. Maddock, Hercules Powder Co.; and Madge Bunting, registration staff.

lation, the NAC Speakers' Bureau, publications, regional meetings, and expressed appreciation for efforts put forth in behalf of the Association, by members of the industry and the NAC staff in Washington.

Following Mr. Mohr on the first morning's program, presided over by Paul Mayfield, was Dr. Clair R. Spealman, chief of the Safety Projects Branch of the Civil Aeronautics Administration. Mr. Spealman spoke on "Medical Problems in Airplane Dusting and Spraying." He said that medical interest in airplane dusting and spraying operations begins with the medical certification of pilots, who, by the nature of their work, must possess good physical and mental qualities, particularly that of vision. Agricultural fliers must of course be of stable temperament and have sound judgment he reminded.

A review of accidents during 1951, showed that 171 accidents of a total of 366, were collisions with wires, poles, trees, buildings, fences and other objects other than the ground and other planes. Some 98 accidents resulted from stalls. Although these accidents are attributed to pilot error, one of the basic causes is that too much is demanded of well-qualified pilots and that they need supplementary aids to prevent such mishaps. "In the case of collisions," he said, "too much dependence is placed upon the ability to see objects obstructing the path of flight during the actual dusting and spraying operations." He said that more experienced pilots make a preliminary survey of an area to be treated in order to have a clear mental picture of obstructions before making the actual run. As to the prevention of stalls, Mr. Spealman said that the usual practice is for the pilot to sense an impending stall by the "feel" of the plane, but this ability is not reliable. Instead, newer craft are being equipped with stall warning devices.

Pilot fatigue is another factor in causing accidents, he said. Agricultural pilots are sometimes called upon to work long hours to apply insecticides or other chemicals at the optimum time. They sometimes also work at crop dusting as a side line, which means that this job must be done after a full day's work has already been put in. "Whatever the reason for the excessive work," he said, "fatigue builds up with the inevitable increased susceptibility to accidents."

The possibility that pilots may be harmed by the presence of toxic dust or spray is also of interest, he said. Every effort is being made by a number of agencies to educate the pilot about the nature of the materials he applies, and to help him to protect himself from possible harm.

W. A. Minor, assistant to the Secretary of Agriculture, Washington, D. C., followed Mr. Spealman to discuss means of filling the "fifth plate"; the food necessary to feed the U. S. in the next few years. Mr. Minor, whose complete text appeared in the September issue of *Agricultural Chemicals*, pointed out that greater production must depend largely upon the application of various agricultural chemicals. Fertilizer will be utilized to grow more, while pesticides will prevent losses of crops during their growth and after harvest.

Dr. G. D Humphrey, president of the University of Wyoming, urged industry to support educational institutions which in turn produce trained technicians required by industry. He pointed out that the Federal Government is showing an interest in aiding education, but warned that "if federal aid becomes the last and sole support of higher education, a whole philosophy of American life will have changed."

The University president quoted figures to indicate that smaller numbers of science graduates are available each year. On the basis of present enrollments, the number of science graduates will be reduced to 36,000 in 1952 (as compared to 75,000 in 1950 and 47,000 in 1951); to 33,500 in 1953 and to 29,000 in 1954. Text of Dr. Humphrey's talk appears elsewhere in this issue.

To complete the morning's ses-

NAC Meeting

ALL attendance records were broken as members of the N.A.C.A. met again at Spring Lake, N. J. The usual top weather was trotted out for the annual gathering, giving those attending something to talk about other than the relatively unsatisfactory seasons which so many in the field have reported. Discouraging as '52 sales may have been, a lot of folks still found the car fare to get to Spring Lake.

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There may have been some crying on shoulders, but in general the old timers look on the season just closed as more or less a normal development in the pesticide field. As one experienced hand pointed out, one season in five is just like '52 has been—or maybe much worse— and that dates way back to the calcium arsenate days. When the market just isn't there, this observer pointed out, it does no good to slash prices. Fortunate is the seller who has the capital position so he can hold on, refuse to unload his stock at a sacrifice, wait til the bugs start biting in earnest, and then sell at a profitable price.

Most of the insiders agree that it has been the new faces in the business that have taken the hardest knocks this season. With the experience of only the past few years behind them, they apparently wondered only "how long has this been going on," and looked forward confidently to each succeeding season being bigger than the one before. Suddenly the rug was pulled out from under them, and the old timers can be pardoned if some of them viewed the '52 proceedings more with satisfaction than concern. Said one, "another year like '52 next year, and the business will be right back in the experienced hands where it belongs."

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We have a feeling, however, that most of the new folks are in the pesticide field to stay. The market is still expanding, and even with substantial carryover stocks there is nothing wrong with the '53 sales and profit outlook that a normal insect

sion, Dr. Paul D. Sanders, editor of the *Southern Planter*, Richmond, Va. discussed the role played by agriculture in the business and social life of the U. S. He traced the manner in which the rural population has diminished over the years, stating that a century ago, 90% of the population lived on farms. It took nine families on the farm to produce enough surplus to feed and clothe one family in the city, he said, but today only 15% of the population live on farms.

Sociologically, the young people from farms have contributed greatly to city populations, both from the standpoint of numbers and also by their contribution to a conservative concept of government.

The editor said that the U.S. must continue to conserve its soil resources to feed a constantly increasing population, and to avoid the pitfalls into which ancient civilizations fell by allowing their topsoil to vanish. "I hope that we have at last realized what older civilizations of the world, like China and Iran, have learned through tragic error: that a rich soil builds a rich civilization; that an impoverished soil means an impoverished people; that a nation cannot rise above its soil resources."

He cited the Mississippi river's carrying away many tons of topsoil every day, as an example of soil wastage. This river dumps 2 million tons of soil into the Gulf of Mexico every day, he said, which is equivalent to 2,000 acres of land six and two-thirds inches deep. This is fifty 40-acre farms a day—over two 40-acre farms an hour! This cannot continue indefinitely without washing the wealth of this nation out to sea, he declared.

NAC GOLF WINNERS

FLIGHT "A"
John A. Nicholson
Agricultural Chemicals, New York
Eugene McCauliff
Glyco Products Co., Brooklyn, N. Y.
R. H. Hodgson
Geigy Co., Inc., New York
D. S. Frederick
Rohm & Haas Co., Philadelphia
Friar Thompson
Prentiss Drug & Chemical Co., New York
Lyle C. Hill
Reasor-Hill Corp., Jacksonville, Ark.
J. F. Hanley
Cooperative Seed & Farm Supply Service
FLIGHT "B"
W. M. Russell
Monsanto Chemical Co., St. Louis
W. H. Haude
Pittsburgh Agricultural Chemical Co.
Paul Schafer
American Cyanamid Co., New York
Silas Bestoff
Fassy & Bestoff, Inc., New York
Bruce Rennie
Tobacco By-Products & Chemical Corp.
FLIGHT "C"
E. J. Geise
J. M. Huber Corp., New York,
J. V. Miller
Atlas Powder Co., Wilmington, Del.
M. J. Bunnell
Geigy Co., Inc., New York
John Long
Tobacco By-Products & Chemical Corp.
W. S. Wallace
U. S. Industrial Chemicals Co., New York
J. I. Shafer
B. G. Pratt Co., Hackensack, N. J.
KICKER'S PRIZE
W. A. Smith, Jr.
Riverdale Chemical Co., Harvey, Ill.
Jack Watson
J. M. Huber Corp., New York
C. H. Winship, Jr.
Phelps Dodge Refining Corp., New York
M. V. Bailey
American Cyanamid Co., New York
BALL NEAREST LINE
T. W. Reed
California Spray Chemical Corp.
W. M. Russell
Monsanto Chemical Co., St. Louis
A. W. Mohr
California Spray Chemical Corp.

1953 Requirements

THURSDAY morning's session was in charge of president Mohr. A statistical paper on the domestic pesticide requirements for the 1953 season was presented by Dr. H. H. Shepard, PMS, U. S. Dept. of Agriculture, Washington, D. C. He said that the estimates are based on two sets of data: reports of production and of inventory position received directly or indirectly from the industry; and from State estimates of the expected percentage shift in usage during the following crop year.

He reported that in 1949-50, production of DDT ran behind domestic demand, and nearly 90% of production (or 59 million lbs.) was used. In 1950-51, however, some 80,000,000 lbs were used, but because of increased production, this represented only 80% of production during this period. Consumption of DDT during the next crop year is expected to be somewhere between 70 and 85 million pounds.

As for BHC, Dr. Shepard stated that the minimum requirement for gamma BHC for next season, should be 9,500,000 pounds, including 2,000,000 pounds of lindane. In terms of 12% technical BHC, this requirement would amount to about 79,000,000 pounds, he said. The estimated *maximum* requirement for BHC should be about 11,400,000 pounds on a gamma basis, equivalent

(*Turn to Page* 102)

Sidelights

year won't cure. The possibilities, for instance, in the increased sale of pesticides to control insects in grass are tremendous. Results to date indicate that a few dollars per acre spent on insect control in grass crops will automatically produce substantial increase in yield. And when insecticide manufacturers begin to add up the vast acreages in grass, they naturally tend to view the future with a certain optimism.

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There always seem to be possibilities of profit in new fields of application. —and in new products as well. Two of the newer products now being worked on are rodenticides,—tomorin, being tested by Geigy, and pival, for which Kilgore Development Co. is responsible.

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Mark down New Orleans for the spring '53 meeting of the N.A.C.A. The time will be along about March 20th and the hotel selected to bear the brunt of the invasion is the Jung. Those who make the meeting of the Southwest branch of the A.A.E.E. will have two southern trips this winter within the space of a month. The southwest branch meeting will be held in late February at Galveston. Chairman of the committee on arrangements will be P. J. Reno, Dallas manager for Hercules Powder Co. This will be the first time a man from the commercial field has been identified this prominently with the convention arrangements, and some innovations are looked for in the entertainment phases of the program.

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P. J. as usual was guide for the Texas-hatted delegation on their trek to Spring Lake. Accompanied by "Pete" Petrus and three other boys wearing the native Texan's identifying sombrero, he reports that the first man they set eyes on when they left their plane at Newark airport was the same cab driver who drove them from Newark to Spring Lake a year ago. The driver spotted them at once,

(*Turn to Page* 88)

Phytopaths Discuss Chemotherapeutants, other means of

Chemical Control of Plant Disease

MEMBERS of the American Phytopathological Society named as president Dr. J. G. Dickson, University of Wisconsin, at the Society's annual meeting at Cornell University, Ithaca, N. Y., September 7-10. Dr. Dickson succeeds Dr. George L. McNew, managing director of Boyce Thompson Institute for Plant Research, Yonkers, N. Y. Named as president-elect, to follow Dr. Dickson next year, is Dr George F. Weber, University of Florida. The new vice-president is Dr. J. H. Jensen, North Carolina State, Raleigh. Saul Rich, Connecticut Agricultural Experiment Station, New Haven, was elected treasurer to succeed Dr. A. E. Dimond, also of Connecticut. Remaining as secretary of the Society is Dr. S. E. A. McCallan, Boyce Thompson Institute for Plant Research, Yonkers.

The Ithaca meeting, held as part of the American Institute of Biological Sciences Convention, attracted a near-record crowd to hear a program giving latest information on many fungicides, progress in plant disease control, and new steps in fungicidal experiments. Concurrent sessions marked each meeting period with activities beginning at 9 a.m. and continuing through the morning, afternoon and evening. The annual Phytopath banquet was held Tuesday evening at Statler Hall.

Two sessions on nematodes and their effect on plant growth were held. The first, Monday night, was a symposium on Plant Parasitic Nematodes, with A. C. Tarjan, Rhode Island U., presiding.

Dr. D. J. Raski, University of California, Berkeley, discussed methods of detecting and investigating plant-parasitic nematodes, point-

Below: Group of speakers at Fungicide Colloquium held Tuesday night, Left to right: Lea S. Hitchner, National Agricultural Chemicals Association, Washington, D. C.; E. A. Walker, U.S.D.A., Washington, D. C.; Dr. L. Gordon Utter, Phelps-Dodge Refining Corp., New York, (chairman); L. R. Reed, Fernhurst, England; Dr. J. R. Harry, Carbide & Carbon Chemicals Corp., New York; M. T. Hilborn, Maine Agricultural Experiment Station, Orono; N. C. Thornton, United Fruit Co., La Lima, Honduras; and Dr. E. C. Stakman, University of Minnesota, St. Paul.

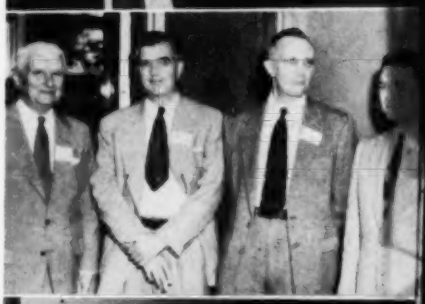
ing out that diagnosis of nematode infections under field conditions is usually difficult or impossible because of their small size and their intimate association with the soil.

Many nematode problems have not been correctly diagnosed in the past, he said, and increasing attention should be given to the possibility of nematodes as causes of many unsolved problems of poor growth or decline of plants.

Laboratory examination and identification are essential before positive diagnosis can be made. Differential fumigation and host plants are useful in detecting and investigating nematodes if their limitations are understood. The practice of making permanent collections on slides or in formalin, was strongly urged by the speaker, so that final identifications may be accurate.

Dr. G. Thorne, U. S. Department of Agriculture, Salt Lake City, Utah, presented a study on representative types of plant parasitic nematodes and their identification, followed by Dr. G. Steiner, U. S. Department of Agriculture, Beltsville, Md., "Phenomena and Problems of the Internal Parasitism of Nematodes in Plants."

Dr. Steiner covered the topic by discussing the mode of migration to and invasion of host by mechanical and chemical action; location of the exact sources of food, and types of



In the Photos

Above (L to R): A line of presidents: Dr. George L. McNew, managing director, Boyce Thompson Institute for Plant Research, Yonkers, N. Y., retiring APS president; Dr. J. G. Dickson, University of Wisconsin, Madison, APS president; Dr. George F. Weber, University of Florida, APS president-elect; and Dr. Johan Gerard ten Houten, Englaan, Wageningen, The Netherlands, president of the Netherlands Phytopathological Society.

At the right: First Photo: Dr. E. E. Clayton, U. S. Department of Agriculture; and Dr. Helen Hart, University of Minnesota, St. Paul.

Second photo: L. M. Hutchins, U.S.D.A.; J. R. Hansbrough, forest pathologist, U.S.D.A., New Haven, Conn.; T. W. Bretz, U.S.D.A., Columbia, Mo.; and Dr. Paul R. Miller, U.S.D.A., Beltsville, Md.

Third Photo: Eugene H. Varney, University of Wisconsin, Madison; W. M. Banfield, University of Massachusetts; and A. A. Nikitin, Tennessee Corp., Atlanta, Ga.

Lower photo: Norman E. Krog, F. R. Racine, R. M. Wilhelm and Curtis L. Mason, all of Niagara Chemical Division, Middleport, N. Y.

parasitism. He described the metabolism of the parasite in its relation to the host, including extra oral digestion in certain crops, effects on the host, such as nutritional deficiencies, necrosis of tissues, toxicity, gall and tumor formation.

Dr. J. R. Christie, U. S. Department of Agriculture, Beltsville, Md., described the four ectoparasitic nematodes of major importance in the southeastern states. These four, *Belonolaimus gracilis* Steiner (the sting nematode), *Trichodorus* sp. (a stubby-root nematode), *Dolichodorus heterocephalus* Cobb (the awl nematode), and *Xiphinema americanum* Cobb (a dagger nematode), feed mostly at root tops and all produce somewhat similar symptoms, he said. Each feeds on many different kinds of plants, so much so that the host lists are far from complete.

Dr. Christie reported that *B. gracilis* probably causes greater crop losses in Florida than any other plant parasitic nematode. Corn, celery, bean, cowpea, and strawberry may be very severely injured; peanuts, pepper, cotton, soybean, and squash may be more or less severely injured. *Trichodorus* sp., which is widespread in the south, probably attains its greatest importance as a parasite of corn. Other crops that may be severely injured include celery, beet, cabbage, chayote, squash and tomato. *D. heterocephalus* is very much like the sting nematode and, while not so common or widespread, can be equally devastating. Crops that may be severely injured include corn, bean, celery and tomato. *X. americanum* is important primarily as a parasite of trees and shrubs although it feeds on the roots of other kinds of plants. Severe injury may be inflicted to the roots of oak trees (*Quercus laurifolia*), pecan trees, and azaleas. Although found occasionally around the roots of oat, corn, and some of the grasses, this nematode is not common in land devoted to the cultivation of annual crops.

Methods of assaying nematicides were discussed by C. W. McBeth, Shell Agricultural Laboratory, Modesto, Calif. He said that the search for new nematicides has two phases: (1) primary screening of many hundreds of chemicals of unknown biological activity to discover those which have inherent toxicity to nematodes and, (2) the testing of those compounds selected by the primary screening for toxicity to different species of nematodes under different soil conditions and on different crops. Primary screening work is done mostly by a few commercial laboratories who have developed specialized methods generally satisfactory for the purpose. The second phase of the work is also carried on by commercial laboratories but is also of special interest to experiment stations and other workers who have submitted to them such compounds as are already known to be nematicidal under standard conditions.

Primary screening work generally includes: (1) an exposure of a standard nematode culture to water solutions or suspensions of test chemicals of known concentration, (2) soil application of fumigants where the test material is injected into the center of a standard container of soil and nematode kill determined after a uniform holding period under constant conditions and, (3) a mechanical mixture in soil of test chemicals of low volatility.

In the Photos

Dr. H. J. Miller, Pennsylvania Salt Manufacturing Co., Philadelphia; Dr. G. C. Kent, Head Dept. of Plant Pathology, Cornell University, Ithaca, N. Y.; J. F. Adams, General Chemical Div., New York; and Dr. L. Gordon Utter, Phelps Dodge Refining Corp., New York.

Part of Head Table at banquet: Mrs. George L. McNew; Johan Gerard ten Houten, president, Netherlands Phytopathological Society; Dr. McNew; Mrs. J. G. Dickson; G. F. Weber; and (barely distinguishable) James H. Jensen, N. Carolina State, Raleigh.

Third Photo: R. W. Fulton, Univ. of Wisconsin, Madison; W.B. Allington, Univ. of Nebraska, Lincoln; J. R. Wallin, Iowa State College, Ames; and Dr. Kent.

Fourth Photo: Muriel J. O'Brien, U.S.D.A., Beltsville, Md.; Ernest Nordlinger, *Food Processing* magazine, Chicago; Dr. R. W. Wellman, Carbide & Carbon Chemicals Div., New York; and Trilok B. Lal, New Delhi, India.

Bottom photo: J. A. Pinckard, Julius Hyman Division, Shell Chemical Corp., Denver, Colo.; David L. Stoddard, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.; and Dr. G. R. Townsend, Belle Glade, Florida.

In secondary testing, the chemicals must be evaluated as nematicides by various methods using applications which would be dependent upon their volatility, water solubility, and chemical stability in contact with air and soil. Various species of nematodes having different feeding habits may be used in tests under various conditions of soil structure, temperature, and moisture. Reaction of various crops growing in nematode-infested soil are checked first in the greenhouse and later in small field plots. Finally, such related problems as phytotoxicity, vertebrate toxicity, and chemical residues in soils and plants, are examined. Performance of some standard nematicides in these tests is given for comparative purposes.

A paper, "Progress and Prospects in the Chemical Control of Nematodes" by Dr. A. L. Taylor, U.S.D.A., Beltsville, Md., concluded the session. He reviewed the history of soil fumigation for nematode control, emphasizing the difficulties encountered in commercial development of control materials and their application. He covered the economic aspects of soil fumigation and outlined an educational program regarded as necessary in the introduction of new pesticides and procedures. (Dr. Taylor's entire paper is scheduled to appear in an early issue of *Agricultural Chemicals.*)

Concurrently, another session was being held on fungicides and chemotherapy under the chairmanship of Paul E. Waggoner, Connecticut Agricultural Experiment Station, New Haven. A paper, "Mercury Bichloride Solution as a Surface Disinfectant for Cereal Seeds," was presented by M. B. Moore and Charles R. Olien, Minnesota Agricultural Experiment Station, St. Paul, Minn. A second "Control of Damping-off Fungi with Halogen Substituted Nitrobenzenes" was presented by Dr. Harold J. Miller, Pennsylvania Salt Mfg. Co., Philadelphia. Dr. Miller pointed out that pea seed treatment tests with 2,4-dinitrofluorobenzene in greenhouse soil heavily infested with damping-off organisms gave emergence equal to standard seed treatment chemicals at the rate of 0.25 per cent by weight of seed of a 10 per cent ative powder formulation. Untreated pea seed gave as low as 0.0 per cent emergence in this soil under similar conditions. Broadcast applications of 10 to 20 pounds per acre of this compound as a spray (emulsion or wettable powder) gave as high as 70 per cent emergence of pea seedlings as compared with only 22 per cent emergence from the untreated areas. No injury was observed to seed planted before or from 2 to 8 days after the soil treatment. None of the related compounds or standard organic fungicides tested gave comparable control when applied to the soil. Control of anthracnose of cotton seedlings with a dosage 0.15 per cent by weight of a powder containing 10 per cent of 2,4-dinitrofluorobenzene was equal to that obtained by other standard seed treatments.

J. G. Dickson, G. R. Grimm and A. L. Hooker, University of Wisconsin, Madison, were co-authors of a paper describing chemical control of stem rust. The paper reported that several naphthoquinones and phenols have shown fungicidal value at low concentrations in the control of stem rust of cereals. Urediospore germination of *Puccinia graminis tritici* was prevented at concentrations as low as

In the Photos:

At the APS banquet table: George W. Fisher, Pullman, Washington; Dr. A. E. Dimond, Connecticut Agricultural Experiment Station, New Haven; Dr. S. E. A. McCallan, Boyce Thompson Institute, Yonkers, N. Y.; Mrs. G. F. Weber; and new APS president, James G. Dickson, University of Wisconsin.

Second photo: C. E. Dieter, Dow Chemical Co., Midland, Mich. and C. C. Johnson, Larvacide Products, Inc., New York. Dr. George L. McNew speaking at banquet.

Third photo: Richard Hartley, W. A. Cleary Co., New Brunswick, N. J.; David Gottlieb, University of Illinois; R. S. Mullin, Virginia Truck Experiment Station; and M. B. Moore, Univ. of Minnesota, St. Paul.

Fourth photo: Other end of banquet table: Dr. McNew; Mrs. J. G. Dickson; G. E. Weber, president-elect; James H. Jensen, North Carolina State College, Raleigh; and Dr. James G. Horsfall, director, Connecticut Agricultural Experiment Station, New Haven.

Bottom photo: Dr. E. M. Stoddard, Connecticut Agri. Experi. Station, New Haven; Dr. George A. Zentmyer, University of California, Riverside; Dr. Horsfall; and Dr. Nathaniel Tischler, Sharples Chemical Co.

2 p.p.m. Spray applications prior to infection using the fungicides with spreader and stabilizer resulted in 90 to 100 per cent rust control at low concentrations for several compounds studied. Spray applications 2 days after inoculating seedlings with urediospores in the greenhouse at 20° C. showed no reduction in subsequent uredial development with the phenols and only small reductions with the naphthoquinones used.

Ethyl alcohol solutions of technical 2, 3-dichloro-1, 4-naphthoquinone (Phygon) with a stabilizer appeared to be the most economical compound presently available, the paper said.

The prediction of field performance of fungicides was described in a paper prepared by Drs. Waggoner, Saul Rich and J. G. Horsfall, all of the Connecticut Agricultural Experiment Station. The paper showed the process through which such predictions are arrived at, with a series of mathematical factors to be considered. Factors such as the amount of material applied, the temperature, the age of the crop, rainfall and others were considered in the calculations.

Dr. A. E. Dimond presented another paper, of which Dr. Waggoner was co-author, on the biochemistry of the lycomarasmin-iron chelated complex; E. M. Stoddard, also of the Connecticut Station, "Chemotherapeutic control of *Rhizoctonia* on greenhouse stock; and David Davis, Connecticut, completed the session with the presentation of two sucessive papers "Inducing Disease Resistance with Plant Growth Regulators" and "Chemotherapy of Tobacco Mosaic Virus."

Tuesday Program

TUESDAY morning's concurrent sessions included a section on Virology, with A. Frank Ross as chairman; another on Fungicidal Action, with Carroll E. Cox as chairman and a third on Nematology, with Dr. W. F. Mai in charge.

In the section on fungicidal action, O. D. Morgan, Jr., University of Maryland, College Park, described the effect of several fungicides on growth of *Sclerotinia fructicola, Glomerell cingulata* and *Penicillium expansum*. His paper reported that cultures were grown on whole-wheat agar plates containing various concentrations of Cu_2O, $CuSO_4$, $CuCL_2$, Bordeaux mixture, Bioquin-1, Bioquin, Fermate, and Puratized. Two concentrations in duplicate were used in each transfer. Twenty transfers were made over a 13-month period. Following the tests, 10 transfers were made to fungicide-free media to determine whether permanent changes had occurred.

All chemicals reduced rate of growth of all fungi exposed. In most instances this characteristic was retained. Permanent loss of spore production occurred in *G. cingulata* on $CuSO_4$ and Bioquin, and in *S. fructicola* on Puratized. Permanent reduction of aerial growth occurred in *G. cingulata* on Cu_2O. Permanent color changes occurred in *G. cingulata* on Fermate and Bioquin and in *S. fructicola* on Puratized. Most chemicals produced some color change in *G. cingulata* during the exposure. *P. expansum* produced a copper color while exposed to Cu_2O, $CuSO_4$, $CuCL_2$, and Bordeaux mixture.

Heavy production of microspores with loss of macrospore production occurred in *S. fruticola* exposed to $CuCL_2$ and $CuSO_4$. Permanent heavy production of coremia occurred in *P. expansum* exposed to Fermate. Bioquin-1 and Bioquin. Resistance developed in 10 instances.

Dr. Mai's session on nematology Tuesday morning featured the presentation of nine papers. These included a study by J. Eldon Cairns, U.S.D.A., Beltsville, Md., on " Anobiotic Survival of a New Species of *Ditylenchus* Nematode; "Studies on the Entry of Larvae of Root-Knot Nematodes into Roots of Susceptible and Resistant Plants" by J. N. Sasser and A. L. Taylor, U.S.D.A.; "Relative Humidity in Relation to the Retention of Viability of Larvae Enclosed in Cysts and Free Larvae of the Golden Nematode, *Heterodera rostochiensis*, Wollenweber;" by chairman Mai and Joyce von Mechow, Cornell; and "Root Galls of Tomato Induced by *Heterodera rostochiensis*, Woll.", by Julius Feldmesser, U.S.D.A., Hicksville, N. Y.

Mr. Feldmesser was co-author with George Fassuliotis, of another paper "An Attempt to Concentrate Golden Nematode-Stimulatory Elements from Potato-Root Leachings"; and B. F. Lownsbery, Connecticut Station, spoke on "Host Preferences of the Recently-Discovered Tobacco Cyst Nematode, *Heterodora sp.*" J. G. Atkins, Jr. and E. H. Todd, Louisiana Experiment Station, Baton Rouge, presented a paper on "Laboratory Screening of Chemicals for Control of Rice White Tip," followed by Lawrence I, Miller, Virginia Agri. Experiment Station, Holland, Va., "Control of the String Nematode on Peanuts in Virginia." He said that tests conducted over a period of 4 years have shown that a mixture containing 40 per cent by weight of ethylene dibromide (Dowfume W-40) at 10 gal. per acre, applied broadcast with a shank applicator at an 8 in. depth, will effectively control the sting nematode and correct the stunted plant disorder. Fumigation should precede planting by at least 2 weeks. The benefits from the control of the sting nematode have been highly profitable in yield and quality of hay and nuts. Erect-growing varieties, as a class, are more subject to injury than prostrate-growing types. Several collections of bunch, runner, and Spanish varieties of peanut, with good agronomic characteristics, have shown a relatively high degree of tolerance to injury associated with the root feeding of *B. gracilis*. The plowing under of green cover crops prior to planting also reduces the severity of the disorder.

William A. Feder, Cornell U., completed the morning's session on Nematology, with a report on "Observations on the Nematocidal Action of Some Organo - Phosphorus Insecticides." He reported that free-swimming foliar nematodes were highly refractile to the toxic action of insecticides in which they were immersed. These pests lived as long in solutions

(*Turn to Page* 88)

Roney-Plaza Hotel, Miami Beach,
Scene of November Meeting of

National Fertilizer Assn.

REPORTS from Miami Beach, Florida, indicate that the 26th Fall Meeting of The National Fertilizer Association, to be held at the Roney Plaza Hotel, November 19-21, will be the largest on record. Some 800 persons are expected to attend.

Among the speakers at the general sessions on November 20 and 21 will be W. N. Watmough, Jr., vice-president, Mixed Fertilizer Division, The Davison Chemical Corporation, Baltimore, Md., who will discuss the problems of safety in the fertilizer industry; A. H. Moseman, chief, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md., who will deal with "New Foundations for Tomorrow's Agriculture;" Warren Garst, executive vice-president, Home State Bank, Jefferson, Iowa, who will speak on the relationship between bankers and the fertilizer industry; W. M. Fifield, director of Agricultural Experiment Station, Gainesville, Fla., who will discuss the relationships between State experiment stations and the fertilizer industry; and W. R. Allstetter, vice-president, NFA, who will make observations on recent fertilizer developments and the future outlook.

The fall meeting dinner, scheduled for Thursday evening, November 20, will be preceded by a social hour to be tendered by H. J. Baker & Bro., New York City.

Numerous other social activities will be featured. Events for ladies only will include a boat ride, a bus tour, and a fashion show at a luncheon. In addition, for all conventioneers, a private travel agency is offering special post convention tours to Havana, Cuba and Nassau.

The meeting of NFA's board of directors will be held at 2 P.M. on November 19.

DR. W. M. FIFIELD
Discusses relationships between experiment stations and industry

A H. MOSEMAN
USDA expert talks on "New Foundations for Tomorrow's Agriculture"

W. N. WATMOUGH, JR.
Scheduled to speak on problems of safety in fertilizer plants

Summary of Industry Committee's Work on Tagged Element

FERTILIZER RESEARCH

The discontinuance of the Industry Committee on Radioactive and Tagged Element Research is regarded as an indication that the program is moving ahead so well that further support by the committe seems to be unnecessary. Dr. Sauchelli, chairman of the Committee, sets forth some of the accomplishments of the Committee as an illustration of how effectively industry funds, given through timely grants, may be employed to initiate and stimulate a larger and more productive research program.

The chairman's summary of the Committee's activities and the history of the group's development, is presented here. —Ed.

IN September 1946, representatives of the fertilizer industry invited several members of the Agricultural Research Administration to a conference to consider the possibilities of using radioactive phosphorus in soils, fertilizer, and plant nutrition research. The possibilities were considered so favorable that an Industry Committee on Radioactive Phosphorus Research was organized for the purpose of supporting radioactive phosphorus research to be conducted by the Agricultural Research Administration and cooperating States.

In 1949 the name of the committee was broadened to Industry Committee on Radioactive and Tagged Element Research. Since its formation in 1946, the following industry representatives have served on the committee: M. V. Bailey, American Cyanamid Co.; F. E. Boyd, Virginia-Carolina Chemical Co.; F. O. Case, Anaconda Copper Mining Co.; J. A. Chucka, Eastern States Farmers' Exchange; F. W. Darner, U. S. Phosphoric Products; D. S. Fink, American Cyanamid Co.; H. E. Hendricks, Knoxville Fertilizer Co.; R. R. Hull, I. P. Thomas & Sons Co.; D. D. Long, International Minerals & Chemical Corp.; H. B. Siems, Swift & Co.; J. E. Totman, Northern Chemical Industries, Inc.; Vincent Sauchelli chairman, Davison Chemical Corporation.

The major functions of the committee were (1) to raise funds from the fertilizer industry to support the cooperative investigations of Federal and State agencies, (2) to advise with the research workers on the research program and assist in the evaluation of the data, and (3) to keep the industry advised on the results being secured.

During the period 1947-52, 42 fertilizer companies contributed $84,600 for the work of the committee. Twenty companies contributed $1,000 or more. Contributions and expenditures by years are given in Table 1.

TABLE 1
Contributions and Expenditures for Radioactive Research

Year	Contributions	Expenditures
1946-47	$12,450.00	$12,450.00
1947-48	20,100.00	19,536.28
1949-50	22,800.00	20,268.12
1950-51	15,300.00	17,500.00
1951-52	13,950.00	9,611.56
	$84,600.00	$79,365.86
Balance		5,234.04

The work was initiated at the Plant Industry Station, Beltsville, Maryland, in 1946-47 with the participation of staff from the North Carolina and New York (Cornell) Agricultural Experiment Stations. In 1948 the committe also supported work at the Iowa and Colorado Agricultural Experiment Stations, thereby helping to initiate radioactive investigations in each of the four land-grant college regions. The committee has continued giving about equal support to research in the Southern, Northeastern, North Central, and Western land-grant college regions. Allocations of the Industry Committee funds were based on recommendations developed by the Regional Soil Research Committees. The extent of of the support by the Industry Committee is indicated by the distribution of expenditures in Table 2.

How Funds Are Used

1. To help provide radioactive phosphorus fertilizers for use in research.
2. To train men in the use of radioactive materials.
3. To assist in the operation of laboratories for analysis of plants and soils for radioactive phosphorus.

by

Dr. Vincent Sauchelli

Davison Chemical Corp., Baltimore, Md., Chairman, Industry Committee on Radioactive and Tagged Element Research

DR. SAUCHELLI

4. To help develop and provide fertilizer distributing equipment for handling radioactive fertilizers in the field.
5. To provide travel funds for the attendance of State representatives to annual work conferences.
6. To support specific research projects.

The Industry Committee advised on the research program, but the actual planning has been done by the research workers themselves. In each of the four regions a phosphorus or radioisotope subcommittee was organized in the Regional Soil Research Committee. Annual work planning conferences were held in November or December to review the year's work and make plans for the following year. Summaries of each year's work were prepared, together with outlines of experiments for the ensuing year.

The results of the cooperative research program were reviewed annually by members of the Industry Committee and other industry representatives at conferences held in Washington or Beltsville. In addition, reports summarizing most of the work were circulated. In this manner, the committee and industry representatives were kept rather fully informed regarding the progress of investigations. A large number of publications have resulted from the cooperative program. Some 40 scientific or technical articles have been published or are on the press. There will be additional publications reporting recent or current work, and in addition, many news articles about these investigations have appeared in the popular press.

While the contributions of the Industry Committee have been substantial, it should be recognized that they have only supplemented Federal and State funds. From the first, the Agricultural Research Administration has devoted substantial funds for radioactive phosphorus investigations. These were supplemented at the beginning of 1949 by funds received by the Agricultural Research Administration from the Atomic Energy Commission. The several States have also supported the cooperative program liberally. No exact estimate of total funds devoted to the investigations is available, but it appears that current investigations in 30 States and Canada must involve annual expenditures in excess of $250,000.

The magnitude and scope of the research program is indicated by a few figures on the production of radioactive fertilizers at the Plant Industry Station in 1951-52. Seventeen shipments of radioactive phosphorus equivalent to 35.7 curies of P^{32} activity were received from Oak Ridge. This phosphorus was used to label 280 pounds of P_2O_5, equivalent to

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TABLE II

Research Grants to State Agricultural Experiment Stations

Agricultural Experimental Station	1946-47	1947-48	1949-50	1950-51	1951-52
Arizona	$	$	$1,500.00	$	$
Colorado		2,500.00	2,000.00	500.00*	2,100.00*
Georgia			2,500.00	500.00	1,500.00
Idaho			1,500.00		
Indiana				500.00*	
Iowa		2,500.00	5,000.00		2,000.00*
Maine			3,000.00	2,000.00*	500.00*
Michigan				3,500.00	
Mississippi				500.00*	700.00*
New Hampshire				2,000.00	1,000.00
New York (Cornell)		2,500.00	2,000.00		
North Carolina	12,445.50	12,000.00	2,500.00	1,500.00	1,500.00
Utah				3,500.00	
Virginia				3,000.00	

*Includes $500 to $700 for regional travel fund.

BUSINESS and education, working together toward the mutual welfare, can make an investment which will assure the progress of the United States.

It has not been many years since business men looked upon educators as "impractical theorists"who did not know the value of a dollar. But not all the contempt was in the minds of business men. Educators, in turn, regarded business men as "penny pinching skinflints"! With such an attitude of mutual disrespect, it is no wonder that both cooperation and progress were slow to develop.

But the picture is changing. The very fact that the president of a small university in Wyoming is invited to address a group of business and industrial leaders is one sign of that change. It emphasizes the fact that all of us are increasingly engaged in a common enterprise toward the betterment of the country.

Shortly after World War II, for example, the Chamber of Commerce of the United States published a report of its Committee on Education which stated, without equivocation, that "education is an essential instrument through which commerce, industry, and agriculture can be expanded in rising degree." The report further asserted that "the cost of adequate education is an investment that local citizens and business can well afford in increased measure, when related step by step to the improvement of local economic conditions."

And then, about a year ago, a resolution adopted by the Board of Directors of the National Association of Manufacturers lent further support to the interdependence of business and education. The resolution urged members of the association to continue their efforts "to secure adequate local, state, and private support for a sound program of elementary and secondary education for all American youth, and to exert every effort to make available to higher education the supplementary private financial support essential to meet the educational needs of our youth, American industry, and the nation."

As an educator, it is perhaps natural for the speaker to insist that America has progressed in a brief space of history from a group of struggling colonies on the Atlantic coast to the most powerful nation in the world largely because of its belief in and support of education, with all that implies of skills, training, and the general level of knowledge. But there are probably not too many who would disagree with theory. The importance of education in maintaining our economy, our standard of living is being recognized more and more.

One does not have to look far to see, from a very practical viewpoint, how education raises the economic status of a nation. Take Brazil and the United States, for example. Brazil has a tremendous wealth in natural resources and an area larger than that of the United States, but it is low in education and technical training. And so the standard of living in Brazil is low. The United States has great wealth in natural resources, too. Add the high level of education and technical training we have in this country, and the result is the highest standard of living in the world.

In order to fulfill industry's future needs for technically-trained men, there must be more

Investment in

Most business men are more interested in maintaining for this country a sound economic system than in amassing large personal fortunes. Income tax being what it is, the latter is a rather hard ambition to realize anyway! So, in the interest of maintaining a sound economy, and its corollary, a general participation in its benefits, let us assume that business needs education. Shortly I shall attempt to show how education needs business, but let us take one at a time.

Trained Personnel Needed

ONE of your principal concerns these days is the need for additional trained personnel, particularly in scientific fields such as entomology, plant pathology, plant physiology, chemistry and chemical engineering.

While the statistics I have been able to find in respect to present supply and future prospects for

*Paper presented before NAC Association, Spring Lake, N. J., September 3, 1952.

trained scientists are not too conclusive, the situation seems to be about as follows:

As of July 1, 1950, there were approximately 40,000 Ph.D.'s in science in the United States, including 16,375 chemists and biochemists, 8,260 biologists, and 1,790 agricultural scientists. In 1950 there were some 75,000 science graduates, 3,500 of whom earned doctor's degrees. In 1951 there were only 47,000 science graduates, and I am informed that on the basis of present enrollments the number of graduates will be reduced to 36,000 in 1952, to 33,500 in 1953, and to 29,000 in 1954.

In addition, there were heavy losses in production of doctorates in the sciences during World War II-some 10,000—and there has been almost no compensation for these loses.

Approximately half of the nation's scientists are employed in educational institutions—in research or teaching. Almost thirty per cent of them are employed in industry, and some fourteen per cent work for the government.

Thus, where industry was able to employ 22,500 scientists from the 1950 graduating class, it appears that only about 8,700 will be available as industry's thirty per cent of the 1954 graduating class. Industry doubtless could compete with education for trained personnel, but all the money in industry cannot employ trained men when trained men are not available. Also, if industry's need is met by drawing from the educational institutions, then training will be inadequate. Correspondingly, if industry is deprived of trained men, then industry and the progress of our nation will suffer.

What, then, is being done or can be done to improve the situation?

One contribution which I might mention in passing is being made by an organization known as Science Service, through which high school students from all over the nation annually compete for the science scholarships offered by Westinghouse. But these scholarships are awarded to no more than forty students, plus 260 others who receive honorable mention and are sometimes awarded scholarships by other organizations or institutions. This method, therefore, merely scratches the surface in discovering and providing higher education for the scientifically talented youth of our country.

What are the colleges doing about the situation? Having been for eleven years president of a separate land-grant college and for seven years president of a state university which has the land-grant college of the state combined with it, I can speak best for the land-grant institutions.

The land-grant colleges were established as a protest against the type of education—largely classical—offered in the mid-nineteenth century. Their aim as set out in the Morrill Act was the special provision for education in agriculture, science, business, engineering, and military training, without neglecting the other fields of learning. Throughout the years since the passage of the Morrill Act, then, land-grant institutions have constantly endeavored to improve and increase their research and offerings in the particular fields mentioned. Perhaps I am prejudiced, but I believe the instruction excels that given in other types of institutions.

But what, you may ask—aside from providing the best possible training—are these colleges and universities doing to meet the needs of industry and government for trained scientists?

Discovering students with interest and natural ability in some science is one of our responsibilities. We attempt to meet this responsibility through tests administered in the high schools, through testing and guidance programs in the colleges, and through contacts with the science teachers in the high schools. We then encourage students who are scientifically inclined to enroll in courses in the particular field of their greatest interest. As often as possible, we add to our encouragement incentive in the form of scholarship aid. Too frequently, however, our scholarship aid is limited, and many gifted students who are not financially able to attend college are lost to science.

Progress

by

Dr. G. D. Humphrey

President, University of Wyoming

The lack of trained scientific personnel became acute during World War II, and the Federal Government instituted programs of aid for training a limited number of individuals. Through such departments as the Atomic Energy Commission, the Office of Naval Research, and the National Science Foundation, scholarships and fellowships have been and are being offered for advanced training in various fields of science.

Government Steps In

ALTHOUGH a member of the National Science Foundation Board, I must confess being somewhat disturbed by the growing tendency to depend on the Federal Government whenever there is a job to be done. I do not want the young people who will be tommorow's political, business, and industrial leaders to feel that government is their only source of encouragement, and that industry and society are indifferent. Yet, they cannot be expected to emerge from college with the deep conviction that they should preserve the system of free enterprise if that system gives no indication that it recognizes their value and usefulness to it.

Think for a minute, if you will, of the teachers in our public schools and in our colleges and universities, a great proportion of whom earn less than bricklayers, plumbers, or factory employees. Consider the man teaching law in a college or university at a salary ranging from $5,000 to $7,000 a year who sees his colleague earn anywhere from $15,000 to $75,000 a year in private practice. And then remember that the education of tomorrow's leaders is entrusted to these teachers. Can you blame them if they become a little critical of a system of free enterprise which allows some to accumulate fortunes while they struggle to provide the necessities of life for themselves and their families?

Do not be too critical of educators who favor Federal aid to education. They are thinking of the underpaid teachers, of students unable to get a college education because of lack of scholarship aid, of inadequate building facilities and outmoded equipment. They are thinking of the great need and seeking earnestly for ways to meet that need. But I realize, as I believe you do, that if Federal aid becomes the last and sole support of higher education, a whole philosophy of American life will have changed.

Industry's Stake Great

WE have talked about the need which business has for education. We have said that American industry has a vital interest in the continuing development of our public schools on all levels. How, then, can industry protect that interest? Would it not be good business to invest in public education?

On the local level, at least, there have been encouraging signs in recent years. In Wyoming, for example, we have a considerable number of scholarships provided by oil companies, agricultural organizations, and private businesses and individuals.

On the national level, we who are in the field of educational administration have been greatly encouraged by the efforts of such industrial leaders as Alfred P. Sloan of General Motors, Frank W. Abrams of Standard Oil, and Irving S. Olds, of U. S. Steel to find ways in which industry can help educational institutions.

The establishment by business and industry of an over-all foundation to provide financial assistance to public supported educational institutions and their students is, I think, a possible solution to the problem. Certainly it would bring many worthwhile results:

It would make unnecessary requests for Federal aid—aid which would have to be provided from taxes collected by the government and redistributed through governmental bureaus and red tape.

Money provided by the type of foundation suggested would provide scholarships for students unable to attend college without financial aid; it would make possible salary increases for underpaid teachers; it would enable institutions to provide better equipment and facilities.

I have done a little calculating and have come up with some interesting figures. The corporations of America have a net income of approximately thirty billion dollars a year. The allowable deductions for gifts for a corporation are five per cent of net income before taxes. Five per cent of the thirty-billion dollar net income of the corporations would be one and a half billion dollars. Now if a billion dollars of this amount, let us say, were placed in a foundation and the interest used for institutions of higher education, there would be $30,000,000 the first year and, if equal amounts were placed in the foundation each year for ten years, the interest at the end of that period would be some $300,000,000.

The total cost of operating public institutions of higher learning in the United States is now approximately $1,400,000,000 per year. When, about 1960, enrollments begin to increase as the students born during the period of high birth rate of the middle 1940's enter college, the cost of operating institutions of higher learning, even at their present level of efficiency, will be considerably more than one and a half billion dollars annually. It is easy to see, then, that some such method, as suggested, would meet a great many of the needs of public education.

And may I suggest that meeting the needs of education enables education to meet the needs of business and industry?

Benjamin Franklin, an outstanding industrialist of his day, said that, "an investment in knowledge always pays the best interest." May I add that an investment in education is an investment in progress-for business, for industry, for government, for every phase of American life. As the cooperation between education and industry is strengthened, each will be able to make a better contribution to the other. I am confident that the years ahead will bring about that investment in progress which will mean a better and more prosperous way of life for all people.★★

122nd American Chemical Society Meeting Brings New Data on Manufacture and Use of

Fertilizers Herbicides Insecticides

SOME forty papers dealing with agricultural insecticides, fertilizers and herbicides were prominent on the program of the 122nd meeting of the American Chemical Society, held at Atlantic City, N. J., September 14-19. Eight thousand chemists participated in the sessions, hearing a record total of 1,046 technical papers which discussed, among other topics, improvements in formulation and application of herbicides, new insecticide materials and more efficient use of fertilizers to increase crop production. Various sessions were held in Convention Hall, the Traymore, Haddon Hall and other Boardwalk hostelries.

Symposium on Herbicides

A SYMPOSIUM on the formulation and action of herbicides featured the opening session of the Division of Agricultural and Food Chemistry the morning of September 15. With H. L. Haller of the U.S.D.A., chairman of the Pesticides Subdivision, presiding, the symposium listed a series of ten papers. Discussing the factors to be considered in selecting an application method for the solution of a particular weed control problem, K. C. Barrons of Dow Chemical Co., Midland, Mich., listed the following:

1. Mode of entry of the herbicide into the plant.
2. Nature and extent of translocation within the plant.
3. The nature of plant responses to the herbicide.
4. Variations in species and varietal response.
5. Effects of stage of growth and the physiological condition of the plant.
6. Effects of atmospheric environment.
7. Relative persistence of the herbicide in the soil.
8. Effects of soil environment on availability, leaching, and absorption.
9. Possible contamination effects adjacent to treated areas.
10. Toxicological considerations.

Discussing the absorption and translocation of herbicides, A. S. Crafts of the University of California, Davis, pointed out that the formulation employed should be chosen to enhance penetration. The herbicide molecules should be as nearly neutral as possible, and should have a balanced solubility. Application should be spotwise to growing synthesizing plants.

Pre-emergence methods of weed control were discussed by Dale E. Wolf of E. I. du Pont de Nemours & Co., who outlined the two general types of pre-emergence treatment, contact and residual. "Chemicals which have shown most promise for pre-emergence treatments on crops," he reported, "are 2,4-dichlorophenoxyacetic acid (2,4-D); calcium cyanamide; 3-(p-chlorophenyl)-1, 1-dimethylurea (CMU); pentachlorophenols; salt of dinitro-o-secondary butyl phenol; sodium 2,4-dichlorophenoxyethyl sulfate; and meta-chlorophenyl isopropyl carbamate (chloro IPC).

"If we were to guess what properties would be present in the perfect pre-emergence chemical we would say it should have low water solubility, ability to resist fixation in the soil, and ability to remain in the soil in an active form for 3 to 4 months and then be rapidly decomposed so as not to leave a residue affecting the crops which follow.

"Some day we may find chemicals specific enough to kill all weeds without injuring certain crops by nature of the tolerance of the crop itself. In the meantime the chemicals available today are effective, and with more fundamental information on the factors which affect herbicidal efficiency of each one of these we will be able to use them where they are best adapted."

Symposium on Fertilizer Use

A SYMPOSIUM on fertilizer usage featured the program of the Division of Fertilizer and Soil Chemistry on Tuesday, September 16th. Presided over by Prof. Firman E. Bear, chairman of the Soils Department of the New Jersey Agricultural Experiment Station, Rutgers University, New Brunswick, N. J., the symposium featured four speakers as follows who spoke on the potential of fertilizer use for more efficient crop production (1) as applied to the northeastern region, Mack Drake, University of Massachusetts (2) the middle west, K. C. Berger, University of Wisconsin (3) the south, James A. Naftel, Pacific Coast Borax Co., and (4) the western states, John P. Conrad, California Agr. Experiment Station. The symposium was introduced by a discussion of fertilizer expenditures in relation to income in the various states by A. L. Mehring, J. R. Adams and G. A. Bennett, Bureau of Plant Industry, U.S.D.A.

In their introduction it was pointed out that the farmers of Cali-

fornia and Texas are currently spending more than twice as large a proportion of their income for fertilizer as during the prewar period. Even larger increases in fertilizer consumption are reported from the north central states. In the fifteen years before World War II, the average expenditure in these states was only a few tenths of a cent out of each dollar, while in 1950 the averages for Minnesota, Iowa, Missouri and Kansas, for example, were respectively, 3.02, 3.15, 6.62 and 2.01. It is only in the southeast that farmers are currently spending a lower percentage of their income than formerly for fertilizer.

For the northeastern region Mr. Drake reported that forage crops offer the greatest potential opportunity for increased application of fertilizers. Historically and currently fertilizer usage is much higher in this region than in any other. Experimental crop yields responses produced by nitrogen, P_2O_5, and K_2O fully justify increasing the current acre applications for all except a few crops. Fundamental information is essential to understanding why high annual applications of fertilizer are so necessary in the Northeast. When soluble phosphate fertilizers are applied to soils of the humid region, active iron and aluminum in the soil react to form relatively insoluble "fixed" phosphates. Soils of the northeastern region are much higher in active iron and aluminum than soils of the other regions and thus much larger applications of phosphate fertilizers are required to supply a given level of available phosphorus to plants in this area. Increased efficiency in the use of phosphorus can be attained by proper use of manure and other organic matter which both reduces phosphorus fixation and increases the availability of fixed phosphates by inactivating the iron and aluminum in the soil.

Reporting for the middle western states, Mr. Berger indicated that present yields of the most important crops are only one-half to two-thirds of the yield potential with full fertilization. For example, corn yields on the average of 44 bushels are reported, which are only two-thirds of the potential with full fertilization. With proper fertilization he estimated that in the heart of the Corn Belt, average yields would reach 75 to 80 bushels per acre, making possible an increased production from this region of some 800,000,000 bushels without increasing acreage. Wheat, he indicated, is yielding in this region only half its potential with full fertilization. With proper application of nitrogen, phosphate and potash, yields of wheat could be increased over 600,000,000 bushels annually.

James A. Naftel, reporting for the south, indicated that grassland farming offers perhaps the most striking example of how adequate fertilization and rotation of combinations of deep-rooted legumes and grasses are bringing about more efficient crop production in this area.

Mr. Conrad reported that in the far west the outlook is for a small but gradually increasing use of added plant nutrients on horticultural crops, as the acreage in use increases and as virgin fertility declines. Historically, growers of tree and vegetable crops in that area have applied adequate to even overly generous amounts of fertilizer, while growers of field crops have tended to depend largely on the original fertility of the soil.

New Arsenical Insecticide

A RATHER limited list of papers dealing with agricultural insecticides was offered. Prominent in the group was a paper by Dr. Roland M. Kary of the American Smelting & Refining Co. reporting on a new organic arsenical insecticide designated as compound "A-42." The new insecticide has three times the potency of DDT in controlling flour beetles, Dr. Kary reported. It is said to be about 130 times more poisonous to the flour beetle than calcium arsenate, twice as toxic to the Mexican bean beetle, ten times more toxic to the German roach and four times more toxic to the Colorado potato beetle.

Termites are killed by mixtures containing only 0.05 per cent of Compound A-42, according to Dr. Kary, who synthesized the insecticide. A dose of 0.10 per cent Compound A-42 destroys granary weevils and 1 per cent kills carpet beetles. Grasshoppers succumb to solutions of half a pound of the chemical in 100 gallons of water, while Japanese beetles can be controlled by a 5 per cent dust formula, he added.

Dr. Kary emphasized that further tests on the compound will be necessary before it can be released for general agricultural use. Field tests are now being conducted on a great variety of crops in important growing areas throughout the United States, Europe and New Zealand. The results of these tests largely will determine the future of the new compound as an insecticide. (This new material was the subject of an article by Theodore Riedeburg in the April, 1952 issue of AGRICULTURAL CHEMICALS, pages 52, 53, 131, 133.)

Other papers presented before the Pesticides Subdivision included the following: "*Analysis of Human Fat for DDT and Related Substances.*" A. M. Mattson, Janet T. Spillane, Curtis Baker, and G. W. Pearce, Communicable Disease Center, Public Health Service, Federal Security Agency, Savannah, Ga.

"*Determination of Maleic Hydrazide Residues In Plant and Animal Tissues.*" Paul R. Wood, Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.

"*Microdetermination of N-1-Naphthylphthalamic Acid Residues.*" Allen E. Smith, Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.

In a paper dealing with "Control of Vapor Concentrations in Closed Spaces" Dr. Amos Turk of the W. B. Connor Engineering Corp., Danbury, Conn., indicated that in studying the migrations of insect pests, it may be very revealing to determine how strongly a particular plant odor influences the insects' travels—either as an attractant or a repellent. If this can be determined experimentally in the laboratory, it should offer very valuable information

(*Turn to Page 91*)

Program Complete for Fertilizer Safety Conference

THE program for the Fertilizer Section of the National Safety Congress has been completed, according to J. S. Fields, Phillips Chemical Co., Bartlesville, Okla., chairman of the Section. The meeting, to be held October 22 and 23 at the Sheraton Hotel, Chicago, is expected to attract a large crowd representing the entire fertilizer industry.

The advance program has been issued as follows:

OCTOBER 22:

2 p. m. Remarks. J. S. Fields

2:15 "Why Safety," J. L. Rosenstein, Univ. of Miami.

3:00 "Multiple Shot Blasting in Fertilizer Storage," Mark Withey, Trojan Powder Co.

3:30 "Fire Prevention in Fertilizer Plants Through Design," G. G. Blair, Egasco Service, Inc.

OCTOBER 23:

8:30 - 11 a.m. Demonstration of Multiple Shot Blasting at International Minerals & Chemical Corp.

2:00 Election of Officers

2:15 Discussion of Multiple Shot

(*Turn to Page* 97)

TOM CLARK

Personnel Director, GLF Soil-Building Service, Ithaca, N. Y. His part on program will be to talk on "How to Conduct a Safety Meeting" Studied at Pace college, Cornell University and the University of Massachusetts.

•

VERNON S. GORNTO

Manager, Insurance Department and director of safety, Smith-Douglass Co., Inc., Norfolk, Va. One of organizers of Fertilizer Sections of several state and regional Safety Conferences, present secretary of the Fertilizer Industry Committee, Chemical Section, National Safety Council.

•

J. L. ROTHSTEIN (Below)

One of the country's foremost psychologists, to talk on that phase of the safety program. Has had broad experience in industrial relations, counselling, writing, and teaching in the field of psychology. A veteran lecturer.

J. S. FIELDS

Safety Director, Phillips Chemical Co., Bartlesville, Okla. Chairman of Fertilizer Industry Committee, Chemical Section, National Safety Council, one of original group to sponsor organization of group. Presides at opening program.

DuPont's West Coast Experimental Farm Test New Chemicals for

Insecticides, Herbicides, Fungicides

SAN Jose Experimental Station, the far western test farm of E. I. duPont de Nemours & Co., Inc., Wilmington, Del., is said to be receiving treatments accorded no other farm land on the West Coast. Broad experimentation with insecticides, fungicides and weed killers is being carried out at the company's plot, with crops ranging from semi-tropical plants and citrus to apples, pears and other crops usually grown in sections of the country with more severe winter temperatures.

The ground was purchased by duPont in 1948, following a year's study of climatic conditions, farming practices and the more serious problems of insects, diseases and weeds as found in the far western states of Washington, Oregon, Idaho, Nevada, California and Arizona.

The property was planted to a variety of fruit trees, mostly French prunes, when first acquired by duPont. During the past three years, however, about half of the acreage has been replanted with tree crops such as apricots, walnuts, peaches, almonds, apples, pears, cherries and prunes. Another area is devoted to

In the Photos:

Left, above (L to R): Nick Lazaneo, foreman of DuPont's experimental farm (seated on tractor) discusses day's operations in orchard with M. C. Swingle, in charge of the farm.

Below, left: F. H. McDiarmid and L. F. Taylor, research investigators at the experimental farm, examine the effects of CMU weed killer applied on test plots at San Jose City Airport.

raspberries, strawberries and grapes while still other sections are planted to a variety of vegetable crops such as corn, broccoli, and lima beans. This diversification of crops is regarded as necessary to provide a range of plants on which to test the numerous experimental pesticides being evaluated.

In charge of experimental work is Millard Swingle, a graduate of Ohio State University. Assisting him are three more agricultural specialists who cover the six states involved in the experiments. These assistants are Lyall F. Taylor and Fred H. McDiarmid, with headquarters at Cupertino, Calif., a short distance from the farm; and C. R. Hunt, who makes his headquarters at the recently-established field headquarters at Corvallis. Mr. Hunt's territory covers the Pacific Northwest.

With farm crops serving as an initial proving ground for new chemical compounds, materials which show promise at San Jose are next tested under large-scale operation methods throughout the six states. Through the cooperation of farm and ranch operators of the area, the chemicals are further tested under typical commercial conditions to see if their promising results continue.

In addition to these tests, the duPont research team also keeps in close touch with federal and state investigators . . . U.S.D.A., State College experiment station personnel and extension service workers. Many of the actual field tests are conducted in cooperation with such investigators.

Supplies of new compounds are made available to these state and federal workers for their own evaluation. Results are tabulated through conferences and exchanges of test data.

The company states that more new chemicals for agriculture were developed last year than in any similar period in history. It also reminds that many questions must be answered regarding not only the efficacy of a given compound, but also its cost, phytotoxicity, residue, ease of formulation, etc., before it can become available on the market.

The Listening Post

Fungicides Tested on Fruit Fire Blight

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

A REPORT from J. G. Atkins, Jr., and N. L. Horn, Louisiana State University, indicates that since 1944, when anthracnose *(Collectotrichum lagenarium)* was first recognized as a serious foliage disease of cucumbers in Louisiana, various fungicides have been evaluated in field tests for control of anthracnose as well as downy mildew. Because of environmental conditions, anthracnose occurs only sporadically and in some years it has not been sufficiently prevalent for field evaluation of the test fungicides. Various recent tests showed conclusively that "Fermate," "Dithane Z-78," "Parzate," and "Orthocide 406" gave good control, while others, such as "Copper A Compound," "Tri-Basic Copper Sulfate," "Cop-O-Zink," "Yellow Cuprocide," and "Crag Potato Fungicide (658)," gave poor or insufficient control. Recently, some of the fungicides from the two groups, effective and ineffective, were tested in the greenhouse for comparison with the results obtained under field conditions.

Cucumbers were planted in four- or six-inch pots, later thinned to approximately four plants per pot, and used in the inoculation tests when they were about six inches in height. The various fungicides to be tested were prepared double strength and diluted 1:1 with an aqueous suspension of conidia of the anthracnose fungus. Following agitation the respective mixtures were sprayed on the cucumber plants by means of a glass atomizer attached to a compressed air line. Control plants were sprayed with the conidial suspension diluted 1:1 with tap water. The plants were held in a moist chamber for approximately 60 hours following treatment. A second group of control plants, not inoculated, were also placed in the moist chamber in some tests.

The fungicides used in the first test were those included in the 1951 field tests. The Marketer variety of cucumber was used with five replications for each treatment. The conidial suspensions were sprayed on the plants within ten minutes following mixing. The test was started November 26 and completed December 3, 1951.

The relative severity of infection on plants used in the first greenhouse inoculation test was in agreement with the relative severity of field infection. In the 1951 field tests, "Experimental Fungicide NP-492" and "Tri-Basic Copper Sulfate" gave poor control, "Crag Potato Fungicide" gave poor to moderate control, and the other fungicides gave good control.

On February 2, 1952, the first test was repeated using four replications per treatment. Dilute conidial suspensions were used in order that the leaf spots could be counted. On February 8, the spots present were counted on all except the lower yellowish leaves, very young leaves, and cotyledonary leaves. The results obtained, (Table 1) were in agreement with those from the first test except possibly for "Crag Potato Fungicide."

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listed in Table 2, were selected for inclusion in further tests. Two pots of cucumbers per treatment were inoculated on April 14 and 17, as tests No. 3 and 4. Leaf spots developing were counted on April 24. The results obtained are presented in Table 2. On the basis of the two tests all of the fungicides except "Yellow Cuprocide," "Copper Compound A," "C. O. C. S.," and probably "Karathane" would be expected to give promise in field tests.

Each inoculation series demonstrated that the copper fungicides were fungicidal in comparison with the controls since they reduced infection. However, they were less effective than any of the organic fungicides tested, with the exception of "NP-492."

TABLE 1.

Relative infection of cucumber plants as a measure of fungicidal action against conidia of *Collectotrichum lagenarium*, in greenhouse tests.

Treatment	Spray Formula*	First Test Relative Infection	Second Test Av. No. Spots per leaf
Control, not inoculated	—	None	0.0
Control, inoculated	—	Heavy	10.5
NP-492°	2-100	Heavy	5.0
Tri-Basic Copper Sulfate	3-100	Heavy	3.2
Crag Potato Fungicide (658)	2-100	Light	Trace
Fermate	2-100	Trace	0.0
Dithane Z-78	2-100	Trace	0.0
Parzate (dry)	2-100	Trace	0.0
Orthocide 406	2-100	Trace	0.0

*Pounds per 100 gallons.
°Experimental fungicide, Pennsylvania Salt Manufacturing Co.

TABLE 2.

Greenhouse screening tests with various fungicides against *Colletotrichum lagenarium*.

Treatment	Dosage	Av. No. Spots per Leaf Test No. 3	Test No. 4
Control	—	9.1	13.3
Phygon-XL	2-100	0.0	0.0
Vancide 51ZW	2-100	0.0	0.0
Manzate	2-100	0.0	0.0
Bioquin 1	2-100	0.0	0.0
Zerlate	2-100	0.0	Trace
Karathane	2-100	0.0	0.1
5379°	2-100	0.0	0.0
Yellow Cuprocide	2-100	Trace	0.4
Copper Compound A	3-100	Trace	0.9
C. O. C. S.	3-100	0.3	2.2

*Experimental Fungicide, Carbide & Carbon Chemicals Co.

The simple greenhouse test described gave results in agreement with those from field tests. Most of the fungicides listed in Table 2 were not tested in the field, however. Probably a simple method, such as the one described, can be used to advantage in evaluating new or experimental fungicides in geographical areas where anthracnose, as well as downy mildew, must be controlled by a spray or dust program.

Owing to the erratic behavior of anthracnose under field conditions, at least in Louisiana, more information might be obtained from greenhouse tests than from replicated field tests. The method should eliminate the necessity of testing all materials in the field. For example, "Experimental Fungicide NP-492" need not have been included in the 1951 field tests since the material gave little or no control of anthracnose. In general, fungicides considered by the manufacturer as promising for late blight or downy mildew control were those selected for field testing in Louisiana. A number of fungicides giving rather effective control of anthracnose, as well as downy mildew, have been selected by the field-test method in Louisiana, but the results from a greenhouse screening program would very likely have provided additional information of value and perhaps resulted in a saving of time and money. The results obtained in greenhouse tests were presented because various fungicide manufacturers are offering many new materials for testing, and recent reports indicate that anthracnose has become a rather important disease of cucumbers in North Carolina and South Carolina, in addition to Louisiana.

The method could probably be improved or standardized by the inclusion of a standard fungicide in each inoculation series, uniform spore suspensions, controlled greenhouse temperatures, etc. Since the method requires little skill, special equipment, or time, this method should perhaps be utilized more by plant pathologists working with cucumber anthracnose as well as other fungi which may be controlled by fungicides.★★

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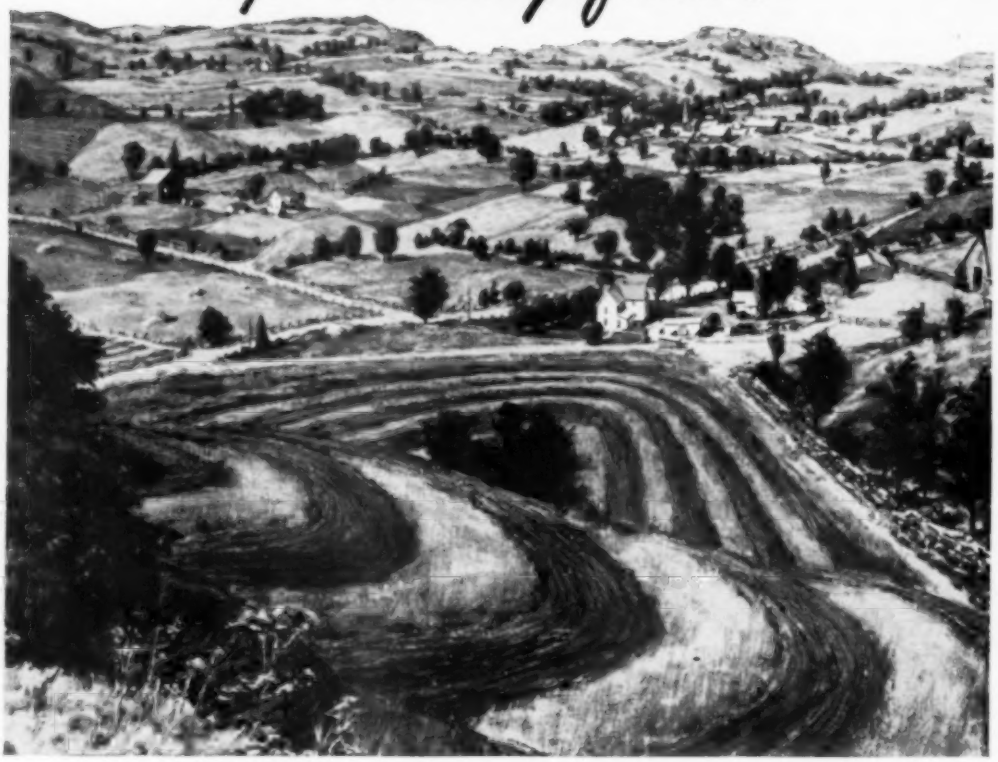

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Cotton, Forest Insect Populations Increase

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the department of Insect Pest Survey and Information, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

Cotton Insects

PINK bollworm, long recognized as a threat to the cotton industry, in 1952, for the first time, caused serious commercial damage to many south Texas cotton fields. The extent of the damage has not been fully determined but in a recent radio broadcast, Prof. R. W. Harned, in charge, Cotton Insect Investigations, stated that "The pest has destroyed a tremendous lot of cotton in about 40 south Texas counties this year—more than it destroyed in the entire 35 previous years that it has been in the United States." We want to keep in mind, however, in evaluating this statement that in past years, due to quarantine, eradication, and other control measures, comparatively little commercial damage has occurred. Not only has the pink bollworm caused serious damage in the south Texas counties mentioned, all of which are in the regulated area of Texas, but recent surveys conducted by the Pink Bollworm Control Project show that there has been a spread of the insect to counties outside the quarantine area. This year, through August 22, 1952, 15 counties outside the regulated area have been found infested in Texas. These counties, all in east Texas, are as follows: Angelina, Anderson, Cherokee, Henderson, Houston, Jasper, Kaufman, Madison, Montgomery, Nacogdoches, Polk, San Jacinto, Trinity, Van Zandt and Walker.

During the past growing season, cotton in the lower Rio Grande Valley of Texas probably suffered greater losses from insects than in any previous season. According to a report from A. N. White, extension entomologist, the drought experienced early in the season retarded the crop and made it more susceptible to heavy insect attack. Frequent rains in June and July allowed insect populations to increase rapidly and hampered seriously the application of insecticides. This condition was in sharp contrast to the 1951 season when a record cotton crop was produced and the principal cotton insects were of virtually no concern during the growing season.

During August, bollweevils increased in west Tennessee counties and infested fields of young cotton in Arkansas for the first time this season. Reports from North Carolina, resumed during September, state that weevils were very abundant in squares and blooms in all late cotton in that state. The season's bollweevil picture for Georgia was a much higher weevil infestation than in 1951, but lower than that of 1950. In Alabama, the large population of adults, combined with a high rate of infestation, indicates that there might be a great number of weevils going into hibernation in the state this winter.

In the Lubbock area of Texas, the leafworm required control measures during late August. Spider mites were also of concern in the Lubbock area and cotton in untreated fields was expected to defoliate prematurely. In New Mexico and Arizona, mites were also building up to severe infestations but the cotton was too far advanced to cause much alarm.

Forest Insects

DURING the past year the Engelmann spruce beetle was responsible for what appears to be one of the most damaging forest insect outbreaks ever to occur in the northern Rocky Mountains. Preliminary surveys revealed that spruce stands collectively valued at $50,000,000 as stumpage were from 5 to 90 percent infested and killed. The epidemic stemmed from beetle populations bred in timbers uprooted in the violent windstorm of November 27, 1949, that swept across the timber belt in northeastern Washington, northern Idaho, and western Montana. The current epidemic appears centered on the Kootenai National Forest in northwestern Montana. Pending further surveys and evaluation of control measures, efforts are underway to salvage the beetle-killed timber which will result in the logging of unprecedented volumes of spruce within the next three years. The full extent of this infestation will not be known until the final results of surveys now underway are tabulated.

Another forest insect which reached outbreak proportions in the Northwest during the past season was a looper *(Melanolophia imitata)*. This outbreak spread through approximately 275,000 acres of forest in Latah County, northern Idaho. Grand fir was involved primarily, but Douglas fir was attacked to a lesser degree. Only current season's growth appears to have been fed upon, but this resulted in almost complete defoliation of the upper crown terminal.

During the summer of 1952 the South also experienced an outbreak of a forest insect. The southern pine beetle reached outbreak proportions in seven southwestern Mississippi counties. Although restricted to scattered infestations amounting to only an estimated 4,800 acres the problem was serious enough that pines were killed and surrounding areas endangered. Control measures consisting of salvaging infested logs and spraying unmerchantable trees and tops with a BHC oil solution were initiated early in the season and are proving instrumental in holding the outbreak in check.

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Insects Affecting Man and Animals

Screw-worms: During late summer there was a decided increase in the number of screw-worm cases in cattle in several states. Reports indicate that infestations in Taylor County, Florida were much heavier than in 1951. Records on one herd of 800 cattle showed 43 cases in late August. An infestation of screw-worms in Nebraska which first became noticeable during early August has now become rather general throughout the central and eastern areas of the State. Indications are that the flies originated from animals imported from Texas. Infestations were also unusually heavy in the vicinity of Stillwater, Oklahoma during September and reports received from Texas during late August stated that the situation was similar in the Kerrville area of Texas.

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DDT Export Controls Out

Removal of export controls over DDT beginning with the fourth quarter of 1952 was recommended by the DDT Industry Advisory Committee at a meeting with the National Production Authority, Department of Commerce, September 23. The recommendation reaffirmed a similar recommendation made by the committee at its June 3, 1952 meeting with NPA. DDT is exported on an open-end quota under licenses issued by the Office of International Trade, Department of Commerce.

A majority of the committee also recommended that the listing of DDT as a Group II material (materials in approximate balance) in NPA's "List of Basic Materials and Alternates" be continued.

Supplies of the principal raw materials used by the industry were outlined by NPA as follows:

Chlorine—In good balance and with spot chlorine easily available. Some shortages may develop in areas east of Michigan and north of the Ohio River because of a strike.

Benzene—In good supply with a general softening of the market indicated.

Sulfuric acid—In approximate balance with demand nationally but with shortages of an economic nature in certain South Central areas.

NPA estimated 1952 DDT production at 135 million pounds if production for the second half of the year is at the same rate as for the first half. Production for 1953 was estimated at between 130 and 145 million pounds. Production figures on a pesticidal year basis (October 1 to September 30) were presented as follows: 1949-50, 67.3 million pounds; 1950-51, 99.2 million pounds and 1951-52, an estimated 120 million pounds.

Requirement estimates were presented by representatives of three Government agencies as follows:

Mutual Security Agency—For Turkey, Greece, Thailand and the Phillipines an estimated 4.0 million pounds of DDT will be needed during the calendar year 1953 largely for malaria control. About 60 to 66 percent will come from the United States.

Office of International Trade—The export estimate of 55 to 60 million for calendar 1953 made in June 1952 is probably high in the light of recent developments. Brazil has slowed imports of pesticidal formulations because of the drought and resulting currency difficulties. The drought in Mexico may also result in that country holding off on purchases. These facts may affect estimated future requirements appreciably because Brazil, Mexico, Turkey and India are the principal consuming countries. Some 14 million pounds of DDT will be needed to meet various Governmental programs such as MSA, World Health Organization, Technical Cooperation Administration and United Nations International Children's Emergency Fund.

Department of Agriculture—Domestic requirements for the pesticidal year 1952-53 were estimated at 70 to 80 million pounds of DDT.

P. H. Groggins of NPA's Chemical Division presided at the meeting.

The following members from industry attended: John F. Kirk, Allied Chemical & Dye Corp., New York City; Harold Davies, Calabama Chemical Co., Huntsville, Ala.; Vernon Bishop, Central Chemical Corp. of Lebanon, Lebanon, Pa.; E. R. Brunskill, Cincinnati Chemical Works, Inc., Cincinnati; J. V. Vernon, Food Machinery & Chemical Corp., Middleport, N. Y.; W. E. Gordon, E. I. du Pont de Nemours & Co., Wilmington; J. G. Brunton, Kolker Chemical Works, Inc., Newark, N. J.; Roland R. Place, Michigan Chemical Co., St. Louis, Mich.; H. C. Koehler, Monsanto Chemical Corp., St. Louis, Mo.; Dr. Pincus Rothberg, Montrose Chemical Corp. of Calif., Newark, N. J.; R. S. Roeller, Pennsylvania Salt Mfg. Co., Philadelphia; William J. F. Francis, Pennsylvania Salt Mfg. Co. of Washington, Tacoma, Wash.; D. F. Murphy, Rohm & Haas Co., Philadelphia; and C. F. Gerlach, Wyandotte Chemicals Corp., Wyandotte, Mich.

•

District Sales Mgr. Dies

Newton E. Andrews, for 31 years with Niagara Chemical Division, Food Machinery & Chemical Corp., died August 26 following a heart attack. At the time of his death, Mr. Andrews was district sales manager for the Michigan, Ohio and Western New York territory. He made his home in Middleport, N. Y., location of the Niagara Chemical Division.

•

Davies to Powell Board

Harold C. Davies, president of Calabama Chemical Co., has been elected a member of the board of directors of John Powell Chemical Co., New York. The Calabama Co. manufactures DDT and other chlorinated compounds which are further processed by the John Powell Co. and marketing through the Powell organization.

•

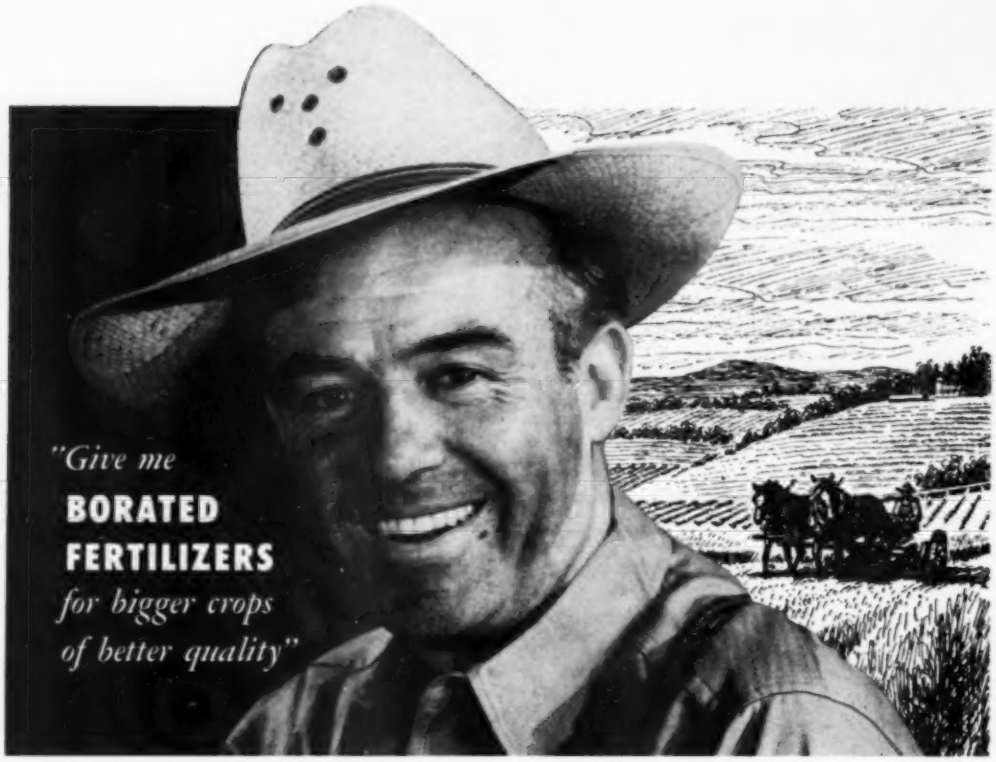
Three to Sales Department

Michigan Alkali division, Wyandotte Chemicals Corporation, has announced the following promotions: M. J. Conway to manager of the central district; H. C. Brunner to manager-distributor sales; Bert McCord to sales representative, central district. All will operate from the home office at Wyandotte, Michigan.

•

50 Years With Heyden

William C. Ellis, was honored recently by Heyden Chemical Corporation executive upon his completion of 50 years continuous service with the company.



BORAX restores lost boron to soil

Yes, Borax does restore lost Boron to soils . . . the Boron that is so essential to fine, healthy crops and big yields. Although the amount of Boron required is extremely small, its importance is comparable to Nitrogen, Potash and the other essential plant foods. Don't let a Boron deficiency in soil cause crops to dwindle and plants to grow puny. Use Fertilizer Borates, the low-cost fertilizer grade of Borax, to restore the boron—then watch the yields of alfalfa, pasture crops, and many vegetable, field and fruit crops as well, increase and improve in quality!

FERTILIZER BORATE-HIGH GRADE, developed especially for the fertilizer trade, is an ore concentrate rich in Boron (*contains approximately 121% Borax equivalent*). In formulating mixtures containing Borax, only 82.9 lbs. of FERTILIZER BORATE-HIGH GRADE is required for each 100 lbs. Borax that you guarantee. Because water content is held to approximately 24% water (5 mols) this material also saves you important money in costs of transportation, storage and handling, etc.

FERTILIZER BORATE (*equivalent to approximately 93% Borax*) and FERTILIZER BORATE-HIGH GRADE (*equivalent to approximately 121% Borax*) come in fine mesh for addition to mixed fertilizer, or coarse mesh for direct application where required. County Agents or State Experimental Stations should be consulted for detailed recommendations. Write today for literature and price quotations!

FERTILIZER BORATE—The Low-Cost Fertilizer Borax

MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

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Technical Briefs

Nitrogen in Tobacco Growth

In the work on soil-nitrogen relationship, a major feature was the study of ammonification and nitrification of a number of nitrogenous materials and their effects on soil reaction. Thus, the maximum of ammonia nitrogen develops in about two weeks for oil seed meals and in less than a week for urea.

The acid soil reaction required for optimum growth of tobacco, restricted to an upper pH limit of 5.5-5.6 because of black rootrot, was found to be satisfactory for nitrification when small and frequent additions of lime materials were made to maintain the pH at this level.

Nitrate nitrogen, which is absorbed by plants preferably under acid soil reaction, was found to be more suitable than ammonia nitrogen.

Oil seed meals gave the highest production of nitrates, reflected in optimum growth of tobacco when these materials were used as a source of nitrogen.

Urea nitrogen is converted into nitrates at a more rapid rate than that in organic oil seed and fish meals.

Lysimeter studies showed that in seasons of excessive rainfall as much as 100 pounds of cottonseed meal nitrogen was leached from the soil. This contrasted to 60 pounds of nitrogen lost in a year with normal precipitation.

Results from irrigation experiments showed that as much as 40 per cent more nitrate nitrogen was produced on irrigated than on non-irrigated land.

Land plaster (gypsum) neutralized ammonia in the soil, and manganese stimulates nitrification; copper and boron were found to have similar properties, and molybdenum is indispensable to nitrogen bacteria.

Calcium in the leaf increased with increasing supply of soil nitrogen up to 250 pounds per acre but decreased at the highest rate, which was 300 pounds of N to the acre.

Nicotine content of the leaf increases with an increase in the amount of ammonium nitrogen absorbed by the plant.

Distribution of nitrogen compounds in the tobacco plant varies with position on the stalk and maturity of leaves. Excessive amounts of nitrogen in tobacco leaves retard burn.

Magnesia increased in the leaf with increased fertilizer nitrogen, while potash was almost unaffected by nitrogen.

Old process cottonseed meal, considered a "standard" source of nitrogen, was used as a measure to evaluate other nitrogenous materials investigated. "New process" cottonseed meal is more "efficient" and produces more nitrate N on an equal basis of fertilizer N.

On this same basis, castor pomace nitrogen is about 25 per cent more available than N in cottonseed meal.

Linseed meal, soybean oil meal and dry ground fish also have a higher rating than cottonseed meal. Among these, linseed meal produced about 10 per cent higher leaf grading quality than other sources.

Nitrate of soda nitrogen is comparable to organic nitrogen in its effect on yield and grading, if the total N requirement is divided and applied at intervals.

Urea nitrogen may be used to substitute for 25 to 50 per cent of the oil seed meal nitrogen without impairing quality of stack-cut tobacco.

A new synthetic nitrogenous material, ureaform, a chemical mixture of urea and formaldehyde, gave promising results when it was used to supply 25 per cent of the required nitrogen, the balance coming from cottonseed meal.

Results from tests with ammonium nitrate indicate that this material may be used as a substitute for a part of the nitrogen obtained from oil seed meals, especially when there is a scarcity of the more suitable materials. The same may be said about Cal-Nitro and to a lesser degree, ammonium sulfate. The latter material finds use as an excellent soil acidifier; applied at the rate of 500 pounds per acre on sandy soils, it reduced pH values more than one unit.

—Summary of Bulletin 559, "The Nitrogen Fertilization of Connecticut Tobacco," by T. R. Swanback, Connecticut Agricultural Experiment Station, New Haven., Conn.

●

Determining 2,4-D & 2,4,5-T

Widespread use of 2,4-D and 2,4,5-T have given rise to instances of contamination of liquid insecticide concentrates used on plants susceptible to these compounds. A method which could detect small quantities of these contaminants as well as distinguish between them would be of use both in control and regulatory enforcement work. Such a method has been devised.

The two acids are separated, after a suitable extraction procedure, by partition chromatography and determined spectrophotometrically by measuring the ultraviolet absorbancy of the acids at 284 and 289 mu. The partitioning solvents are 90% methanol and n-hexane and the supporting medium is silicic acid. A 1 to 5 formic-acetic acid mixture is added to the 90% methanol (immobile phase) to repress ionization of the acids. A background correction is frequently necessary and the means of making such a correction is given. The method has been successfully applied to the determination of small quantities of 2,4-D present as a contaminant in authentic liquid insecticide concentrates. It has also been applied to the determination of the acids in prepared insecticide dusts and alfalfa hay extracts. Other herbicidal compounds or intermediates used in the preparation of 2,4-D and 2,4,5-T do not interfere with the analysis. Determinations are within 5% of added amounts of acid.

—Spectrophotometric Determination of Small Quantities of 2,4-D and 2,4,5-T Using Partition Chromatography, by Nathan Gordon and Morton Beroza, Office of Chief Chemical Officer and U.S.D.A., respectively, before ACS meeting, Atlantic City, N. J., September, 1952.

A WHOLE FARM THRIVES ON NOURISHMENT

This happy family gets the best nourishment and plenty of it. For, as every good farmer knows, well-fed poultry pays off in peak production and bigger profits.

The good farmer is careful, also, to nourish his soil—the ultimate source of all animal and vegetable growth. Rich plant-food elements yielded daily by the soil must be replaced regularly if the land is to supply the demands all living things make on it.

Many of the most effective soil-replenishing fertilizers contain POTASH . . . often Sunshine State Potash, a product of New Mexico. Potash not only nourishes the soil, it also strengthens crops by helping to resist disease and drought. Wisely used, potash can be one of the most valuable profit-producing aids a farmer can have.

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GRANULAR MURIATE OF POTASH 48/52% K_2O
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UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.

Suppliers' Bulletins

Pyrophyllite Folder Out

A new folder has been published by Glendon Pyrophyllite Co. describing its insecticide grade of pyrophyllite. The booklet tells about where the raw mineral is found, how it is ground (to pass through a 325-mesh screen), its chemical and physical properties, including its non-alkalinity and chemical inertness and compatibility with all leading insecticidal compounds. The booklet states that pyrophyllite maintains the same homogeneous mixtures, has better adhering properties and will settle more quickly than other diluents. The booklet is available from Glendon Pyrophyllite Co., 10 E. 40th St., New York 16, N.Y.

•

Offers Krilium Bulletin

A progress report summarizing various tests of Krilium soil conditioner in commercial agriculture has been published by Monsanto Chemical Company, St. Louis.

The company and its technical cooperators, including universities and federal and state agencies, have been testing Krilium in agriculture for several years. Additionally, more than 25 large commercial growers now have the product under test in many sections of the country.

The report discusses the economics of Krilium and also describes several specialized farm applications which show promise.

Copies of the report may be obtained by writing the Merchandising Division, Monsanto Chemical Company, St. Louis 4, Mo.

•

New Salt-Free Sulfonates

Ninol Laboratories, Chicago, have begun production of a line of sulfonated detergents using a new sulfonating technique. The new process features employment of liquified sulfur trioxide as a sulfonating agent in place of the conventional oleum. First detergent manufacturer in the U. S. to use this process, Ninol claims it makes possible the production of salt-free sulfonates at economical price levels.

Using standard sulfonating methods it has hitherto been difficult to produce detergents containing less than 15% salt contamination. The new sulfur trioxide method yields products with under 0.1% salts, the makers state. Advantages are said to include better solubility in either water or oil, and greater stability of many formulations.

Already in production are "Ninex 21" (a foam-stabilized liquid detergent) and "Toximul" (anionic agricultural emulsifier).

•

Electrolyser Described

General Industrial Development Corporation, exclusive agent in the U. S. and Canada for Bamag-Meguin, has available for distribution an 8-page bulletin on Bamag pressure bipolar type electrolytic cells for the manufacture of pure hydrogen and oxygen. The bulletin discusses in detail the operation of the electrolyser. Several illustrations, a layout of a typical installation, a schematic drawing, performance curves and complete technical data make up the contents of the booklet. The Bamag electrolyser is said to be characterized by its high efficiency, automatic operation and long life. The bulletin is available from General Industrial Development Corp., 270 Park Avenue, New York 17, N. Y.

•

Seed Treatment Folder

A new bulletin, "Seed Treatments With Peroxygen Chemicals" has been issued by Buffalo Electro-Chemical Co., Inc., Buffalo, N. Y. The bulletin describes the action of the chemicals in removal of the seed coat; disinfection of seed coat; improvement of germination of seeds and improvement of gluten quality in wheat grain. Experiments and patents dealing with chemical treatments as applied to these four groupings are included, all of them indicating advantages of peroxygen chemicals. Copies of the bulletin, No. 33, may be obtained by writing to the Becco Sales Corporation, Station B, Buffalo 7, N. Y.

•

Miticide is Described

A bulletin describing "Estomite" miticide has been issued by Eston Chemicals, Inc., 3100 E. 26th St., Los Angeles, 23, Calif. The product, containing p (chlorophenyl) p (chlorobenzene) sulfonate, is said to control mites on citrus, almonds, prunes, peaches, walnuts, melons, grapes, strawberries, figs, beans, cotton and ornamentals. The single-page descriptive bulletin is available upon request.

•

Offers Portable Ramp

An illustrated, descriptive bulletin on its loading ramp unit has been issued by John B. Illo Engineering Co., Los Angeles. The ramp is said to speed both loading and unloading by allowing forklift trucks to drive into truck and out. It is operated by either electric push-button control or manually operated. The makers state that the loading ramps enable one man to do the work usually requiring ten and that any of the hazards of handling bags and other items are reduced. Write for the bulletin in care of the company, 2414 E. 57th St., Los Angeles 58, Calif.

•

Brochure on Bag Holders

The Richardson Scale Company, Clifton, N. J. has announced a new two-color, six-page brochure covering four different types of bag holders to secure bags to hopper outlets during filling.

The bulletin includes nine photographs and gives operating details and recommended applications for clamp, inflated-ring, cable and cam grip types of holders. It covers highspeed filling operations, filling different sizes and types of bags, handling of toxic materials, filling from

(*Turn to Page* 87)

Du Pont Announces

80% CMU

WEED KILLER

An Outstanding New Herbicide for RAILROAD RIGHTS-OF-WAY and INDUSTRIAL AREAS

Results with Du Pont 80% CMU Weed Killer are promising, as the photo indicates. CMU applied in April to the track at the right in the photo showed this result in August. The track at left in the photo was untreated.

Now you can get practical control of weeds and grass for a year or longer with one application of Du Pont CMU. It is highly effective against most vegetation and can be used at any time of year. In arid areas, it is best to apply CMU before the rainy season. Just mix with water and spray on the ground. CMU gives best results at lowest cost if applied before weeds begin to grow. However, it is effective on most plants at any stage of growth.

Many tests throughout the United States and Canada have proved that Du Pont CMU is highly practical to keep ground clear of vegetation along railroad tracks and sidings, power plants, pipelines, docks, naval yards and storage areas. Its non-flammability gives it added advantages around lumber yards, pole yards, oil-tank farms, outdoor billboards, recreation and fair grounds. And its low volatility helps prevent spray-drift damage where crops or valuable ornamentals are near the outdoor installations and manufacturing or equipment storage areas to be kept clear of weeds.

Though CMU is also being tested for weed control in crops its major applications today are for these industrial uses. For full information, write Du Pont, Grasselli Chemicals Department, Wilmington, Delaware.

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150th Anniversary

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DU PONT CHEMICALS FOR THE FARM INCLUDE: *Fungicides:* PARZATE® (Liquid and Dry), FERMATE®, ZERLATE®, Copper-A (Fixed Copper), SULFORON® and SULFORON®-X Wettable Sulfurs . . . *Insecticides:* DEENATE® DDT, MARLATE® Methoxychlor, LEXONE® Benzene Hexachloride, KRENITE® Dinitro Spray, EPN 300 Insecticide, Calcium Arsenate, Lead Arsenate . . . *Weed and Brush Killers:* AMMATE®, 2,4-D, TCA and 2,4,5-T . . . Also: Du Pont Cotton Dusts, Du Pont Spreader-Sticker FARMONE® Fruit Drop Inhibitor and many others.

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On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

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Chicago Heat-Dried Activated Sludge, Nitroganic Tankage, a valuable fertilizer and soil conditioner, is now available in large quantities. An excellent raw material for the manufacture of balanced fertilizers, it supplies organic nitrogen, available phosphoric acid and humus. Contact H. J. Baker & Bro. today for further information.

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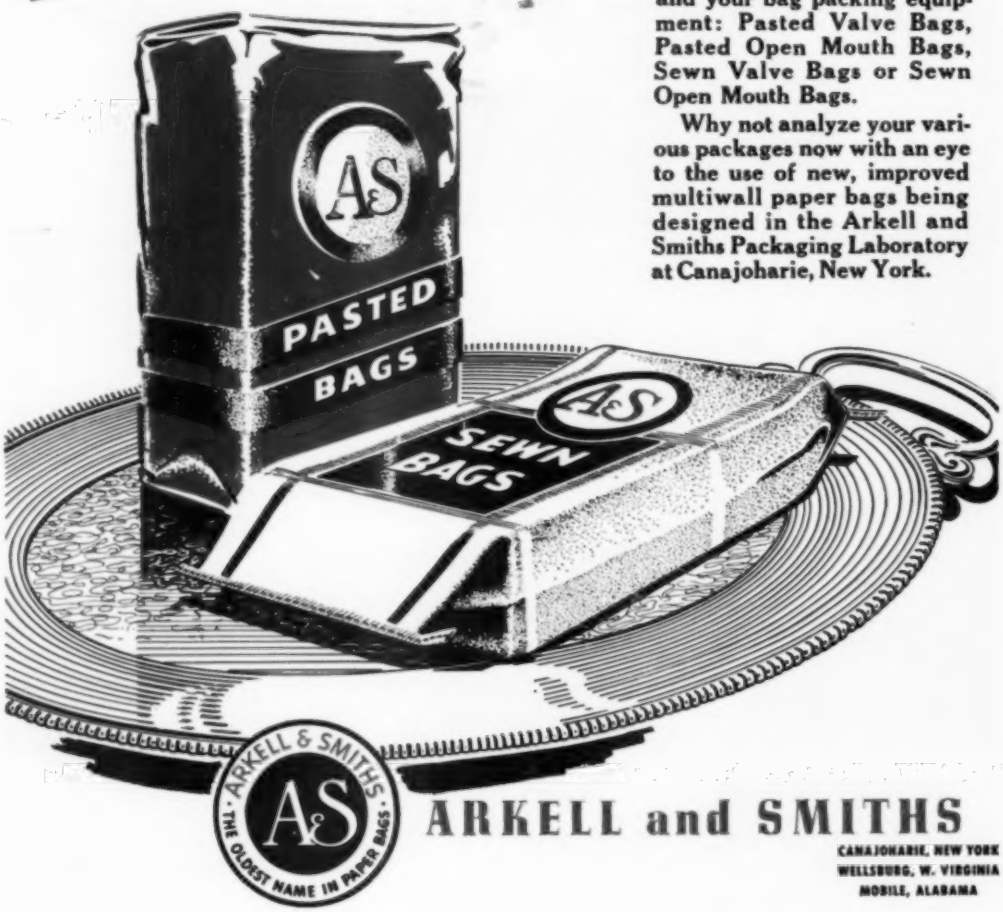
help yourself to better packaging

Practically any powdered or granular product can be packed *economically* and *attractively* in A&S multiwall bags. You have the choice of four types of multiwall paper bags with from one to six plies dependent on your product and your bag packing equipment: Pasted Valve Bags, Pasted Open Mouth Bags, Sewn Valve Bags or Sewn Open Mouth Bags.

Why not analyze your various packages now with an eye to the use of new, improved multiwall paper bags being designed in the Arkell and Smiths Packaging Laboratory at Canajoharie, New York.



ARKELL and SMITHS

CANAJOHARIE, NEW YORK
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MOBILE, ALABAMA

High-nitrogen fertilizer program for corn nets $21.59 more per acre for Lee Andrews, Grant County, Wis.

● Here's another young farmer who found out for himself how well a high-nitrogen fertilizer program pays off.

Lee Andrews of Grant County, Wis., broadcast and plowed down 800 pounds of 8-8-8 fertilizer per acre and applied the usual amount of row fertilizer. Comparing the corn yield with that from an unfertilized test plot, he found that this program gave him a net return of $21.59 *more* per acre.

Cooperating with Mr. Andrews in this experiment were George Dehnert, former Grant County Farm Agent, and Prof. C. J. Chapman, of the Department of Soils at the University of Wisconsin.

Bigger yields for farmers mean better business for you

● Experiences like these are convincing evidence to farmers that high-nitrogen complete fertilizers are a paying proposition. The bigger yields pay the fertilizer cost many times over.

And experiences like these are the reason why you're finding the demand for high-nitrogen fertilizers climbing steadily. You're missing a good bet if you're not giving these fertilizer grades special promotion efforts.

You have an extra selling point when you use U·S·S Ammonium Sulphate to supply the nitrogen in these grades. This dry, free-running nitrogen material mixes easily, stands up in storage and handles well in drills or other distributing equipment.

If you'd like more information on U·S·S Ammonium Sulphate, contact our nearest Coal Chemical Sales Office or write directly to United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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Here's another example in which Pittsburgh sets the *Standard for Quality!* All Pittsburgh Brush Killers now contain a new low volatile ester. That means that mesquite and other brushes and woody growths can now be eliminated from rangeland economically and with minimum danger to valuable crops. Pittsburgh has a complete family of brush killers to meet every control need. Pittsburgh Brush Killer 22 effectively controls general rangeland brush and weeds. And for the control of mesquite, briars, sagebrush, scrub oak and other hard-to-kill woody growth, order Pittsburgh Low-Vol 4. ● When you begin planning your 1953 brush killer requirements write for free bulletin on Pittsburgh *Quality-Controlled* Brush Killers.

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Annual grass weeds growing profusely in untreated cotton. This results in increased cost of the crop.

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AFTER the past year of limited commercial use by growers, Chloro-IPC has shown its superior merits in controlling annual grasses, such as crabgrass, in cotton fields.

Columbia-Southern in pioneering this research and development program is able to place at your disposal imposing quantities of test data gathered as a result of a widespread grant-in-aid program.

Highlights of this new data cover the effects of air temperatures, soil temperatures, soil moisture, rainfall, soil types, application methods, dosages, timing, types of weeds controlled, and so forth.

Accurate studies have revealed the right and wrong way to use Chloro-IPC—how to get maximum effects on weeds with minimum injury to crops.

Plan now to take an active part in the further market development of Chloro-IPC in 1953. Call for a conference with Columbia-Southern agricultural specialists today.

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Amazing new Lindane is the greatest insecticide of all time. It means effective control of virtually all species of insects and pests. Highly versatile, Lindane fills every insecticide need—from a household spray to formulations for spraying edible field crops and truck gardens. Non-toxic to farm animals, Lindane is fully approved for spraying dairy herds.

Pure gamma isomer . . . Lindane is the nearest perfect insecticide yet developed. For complete details contact Tennessee Products & Chemical Corp., Dept. FC92, First American National Bank Building, Nashville, Tennessee.

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  - Emulsifiable concentrates
  - Wettable powders
  - Dust concentrates
- **RHOTHANE (TDE or DDD) Insecticides**
  - Technical flake
  - Solutions
  - Emulsifiable concentrates
  - Wettable powders
  - Dust concentrates
- **DITHANE Fungicides**
  - Solution
  - Wettable powder
  - Dust concentrate
- **2,4-D Weed Killers**
  - Acid
  - Butyl ester
  - Isopropyl ester
  - Tetrahydrofurfuryl ester (low volatile)
  - Amine salts
  - Emulsifiable concentrates
- **2,4,5-T Weed Killers**
  - Butyl ester
  - Isopropyl ester
  - Tetrahydrofurfuryl ester (low volatile)
  - Emulsifiable concentrates

TRITON Emulsifiers are also manufactured and offered by Rohm & Haas in a wide selection for the economical and effective emulsification of the many organic pesticides in use today.

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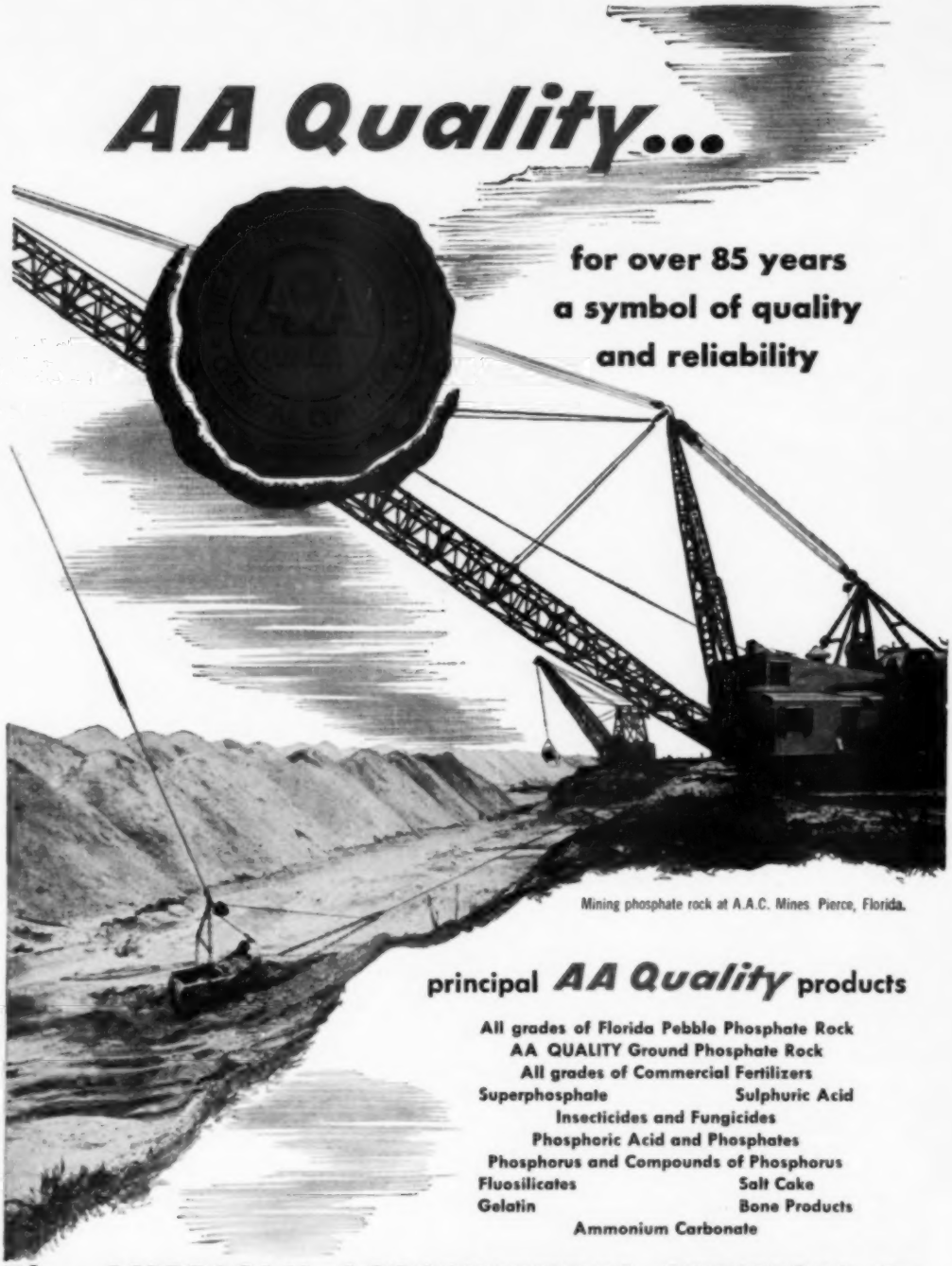

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INDUSTRY NEWS

Davison Names G. Klein & B. C. Manker

APPOINTMENTS of George Klein as district manager, located at Nashville, and of Bernard C. Manker as district manager at Lansing, of The Davison Chemical Corporation's Mixed Fertilizer Division have been announced by William N. Watmough, Jr., vice-president in charge of the division.

GEORGE KLEIN

BERNARD C. MANKER

The appointments became effective September 1. These are posts newly-created as part of a change in the management of the organization of the fertilizer operation. Mr. Klein, formerly manager of the Nashville plant, is now in charge of a group of plants serving the south and areas west of the Mississippi River. Mr. Manker, formerly manager of the Lansing plant, takes charge of a group of plants serving the midwest, principally Michigan, Ohio and northern Indiana. Plant managers under the new organization continue in their posts but will report to the district managers instead of to Baltimore. The district managers report to Mr. Watmough.

Mr. Klein has been in the fertilizer business for 35 years, 31 of which have been with Davison and predecessor companies. A native Baltimorean, he lived and worked here until 1944 when he was made manager at Nashville.

Mr. Manker, a native of Clay City, Illinois, has been in the fertilizer business for 35 years; first with the Armour Fertilizer Works, and since 1928 with The Michigan Fertilizer Company as sales manager at the latter concern's Lansing plant, until in 1951 when he came with Davison upon the acquisition of that plant.

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35 Million Loan to Grace

W. R. Grace & Co., New York, has completed negotiations for a 30-year, $35,000,000 loan to diversify its activities, particularly in the chemical field. The loan is to supplement the firm's funds for the financing of its expansion over a period of years. The loan was obtained from four major insurance companies in New York and Hartford, according to J. Peter Grace, Jr., president.

Several months ago announcement was made that a proposed subsidiary of W. R. Grace & Co. was planning the construction of an ammonia-urea plant at a site which has not yet been disclosed. The plant, to cost approximately eighteen million dollars, will mark the entry of Grace into the domestic petro-chemical field. Plans are being actively developed for further expansion in petro-chemicals.

The ninety-eight year old firm is well known for its industrial investments in North and South America. It wholly owns Grace Line and its domestic interests include Naco Fertilizer Company, with offices and stores in the Carolinas, Florida, Ohio, and California; a financial interest in the Dewey & Almy Chemical Co., worldwide chemical, research, and manufacturing organization; and ownership of approximately 20% of the stock of Davison Chemical Corporation. W. R. Grace & Co. also is half owner of Panagra (Pan American-Grace Airways) and is majority stockholder of the Grace National Bank.

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Ewing to New Post

K. P. Ewing, for 32 years research entomologist with the USDA Cotton Insect Division, has been chosen to coordinate the expanded cooperative research programs of USDA and various States and other agencies set up to bring the pink bollworm under control. He will be responsible for all USDA cotton insect surveys and research in Texas and Oklahoma, but his biggest task will be in organizing forces to control the pink bollworm, now resisting all efforts to suppress it. Although the major infestation is currently confined to Southern Texas, the pest is threatening the entire Cotton Belt.

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Eastern AAEE to Baltimore

The Eastern Branch of the American Association of Economic Entomologists will hold its annual meeting November 24 and 25 at the Lord Baltimore Hotel, Baltimore, Md., according to B. F. Driggers, Rutgers University, New Brunswick, N. J., secretary of the group.

Diamond Ups Two

Managerial appointments at two important branch sales offices of Diamond Alkali Company have been announced by W. H. McConnell, the company's director of sales. Effective November 1, Earl J. Mills will become manager of the Chicago branch sales office, succeeding the late Charles W. Klaus, and John W. Kennady will be manager of the Southwest District sales office, with headquarters at Houston, Texas.

The Chicago office supervises Diamond sales activities in a nine-state area comprising Illinois, Indiana, Iowa, Michigan, Minnesota, Wisconsin, Nebraska, and the Dakotas. The Southwest District embraces the states of Texas, Oklahoma, and Kansas.

The move will return Mr. Mills to Chicago, where from 1945 until 1949, he was manager of less-carload sales for Diamond.

Mr. Mills, 51, is a veteran member of the sales department, having been with the firm since 1932. Throughout his many years with the company in sales, service, and supervisory capacities, he has covered the country extensively. He is a native of Providence, R. I.

Mr. Kennady, new manager of the Southwest sales office, is 42, formerly with Kolker Chemical Works, Inc., a Diamond subsidiary, which he has been serving as district manager at Kolker's Houston plant.

A native Pennsylvanian, Mr. Kennady was born in Pittsburgh, and holds a degree from Penn State College, where he was graduated with a major in agriculture in 1932.

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Baughman Appoints Cadle

The Baughman Manufacturing Company, Jerseyville, Ill., manufacturer of spreading and conveying equipment, has appointed James E. Cadle sales manager of the organization. Mr. Cadle began his career with Baughman in the storeroom. Following two and a half years in the Air Force during World War II, he returned to Baughmann to accept the position of foreman. From here he began to advance — first as superintendent, later traveling on the road for the central division, and then plant manager prior to his latest appointment.

Mr. Cadle will control his national sales program by flying one of the company-owned Cessnas used by the Baughman salesmen.

The company has also announced that F. Michael Hanlon has recently joined the firm as division manager of the Western Division . . . a territory that includes 11 western states.

Mr. Hanlon was formerly St. Louis representative for the Mobilift Corporation. His experience includes a position as sales and service engineer . . . helping to establish a preventive maintenance program for customer equipment.

•

Advancements Noted

Michigan Alkali div., Wyandotte Chemicals Corporation, has announced the following promotions in the division, effective October 1st: R. C. Leonard to product manager — Caustic Soda and Chlorine; P. M. Bigley to product manager Soda Ash, Dry Ice and Bicarbonate of Soda; R. K. Rigger to product manager — Synthetic Detergents; T. R. Boyle to administrative assistant to the vice-president — Michigan Alkali division. These men will be located at Wyandotte.

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Mathieson Names Thomas

Frank Thomas has just been named director of sales of the agricultural chemicals division of Mathieson Chemical Corp., Baltimore. He was formerly sales manager of the specialties division. His new post will entail a move from Baltimore to Little Rock, Arkansas

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Fertilizer Use Program

A joint program to promote more efficient use of fertilizer and lime was announced on September 11 by Secretary of Agriculture Charles F. Brannan and president R. F. Poole of Clemson College, chairman of the executive committee of the Association of Land-Grant Colleges and Universities.

Their statement declared that an expanded long-range program of research and education will be required to realize the objective of promoting effective and proper use of these elements. "This will require a coordinated effort by the U. S. Department of Agriculture and the Land-Grant Colleges in cooperation with the fertilizer and lime industries and other public and private organizations," the joint statement said.

A steering committee to provide guidance at the national level has been named. Its members include the following:

For the State Extension Services: Marvin A. Anderson, associate director of Extension, Iowa State College, Ames, chairman for Extension; James Gwin, director of extension, College Park, Maryland; D. W. Watkins, director of extension, Clemson; and G. H. Starr, director of extension, University of Wyoming, Laramie.

For the Agricultural Experiment Stations: R. W. Cummings, director of research, North Carolina State College, Raleigh, chairman for the Experiment Stations; H. R. Varney, director, Agricultural Experiment Station, West Virginia University, Morgantown; Phil S. Eckert, director, Agricultural Experiment Station, University of Arizona, Tucson; and N. J. Volk, associate director, Agricultural Experiment Station, Lafayette, Ind.

For the Department: W. A. Minor, assistant to the Secretary, chairman for the Department; Sherman E. Johnson, assistant chief, Bureau of Agricultural Economics; F. W. Parker, soils research director, Agricultural Research Administration; L. B. Taylor, director, Office of Materials and Facilities, Production and Marketing Administration; L. I. Jones, coordinator, Cotton and Grasslands Programs, Extension Service; and H. C. Knoblauch, assistant chief, Office of Experiment Stations.

Shell Expands Territory

A. J. Garon, since 1950 technical salesman in the Houston, Texas, district, has been appointed manager of the Houston Area for Julius Hyman & Co., Division of Shell Chemical Corp. The expansion of southern agriculture has made necesary the formation of an agricultural sales area for the states of Texas, Oklahoma, Arkanas, Louisiana and Mississippi, the company stated. The office for this area will be located at 1601 Melrose Bldg, Houston.

Mr. Garon, a native of Louisiana, holds an M.S. degree from L.S.U.

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SW Branch, AAEE to Meet

The Southwestern Branch of the American Association of Economic Entomologists will hold its annual meeting at the Galvez Hotel, Galveston, Texas, February 26 and 27, according to P. J. Reno, branch chairman. Details of the meeting have not been worked out as yet, but a committee is at work on them at present.

•

A-W Elects New VPs

Gus Ashcraft and Robert Ashcraft have recently been elected vice-presidents of Ashcraft Wilkinson Co., Atlanta. Gus formerly held the office of secretary. Robert Ashcraft continues as manager of the Norfolk office.

•

Fulton Executive Dies

Benjamin Elsas, former president and board chairman of Fulton Bag and Cotton Mills in Atlanta, passed away August 26 after a five-month illness. He was chairman of Fulton Bag's executive committee at the time of his death.

A native of Atlanta, Ga., Mr. Elsas was graduated from Harvard University and later studied in Germany. As a young man he lived in India.

Following the death of his brother, Oscar Elsas, in 1924, Mr. Elsas became president of Fulton Bag. While he held this office the company continued its nationwide expansion program, and today operates plants in Dallas, New Orleans, Los Angeles, St. Louis, Kansas City, Denver and Minneapolis, Minnesota.

After retiring as president, Mr. Elsas served as chairman of the board before assuming duties as chairman of the executive committee.

Columbia-Southern Appoints Two

Appointment of Eugene D. Witman as manager of Agricultural Chemical Development and Edwin D. Plant as manager of Agricultural Chemical Sales for Columbia-Southern Chemical Corporation has been announced by Harry W. Gleichert, assistant to the vice-president in charge of sales.

EUGENE D. WITMAN

EDWIN D. PLANT

Associated with Columbia-Southern for three years, Dr. Witman had served as agricultural chemical specialist in the firm's Market Research and Development Department. Before joining Columbia-Southern, he had been associated with Sherwin-Williams Company as assistant director, Agricultural Chemicals Division.

A native of New Albany, Indiana,, Dr. Witman received his doctor's degree in chemistry from Ohio State University. He is a member of the Research Committee, North Central Weed Control Conference; member, American Chemical Society; and had served as special consultant for the Office of Scientific Research during World War II.

Mr. Plant has been associated with Columbia-Southern since his graduation during 1938 from the University of Minnesota with the degree of B.S. in Chemical Engineering.

He had served as an engineer in the research, development and production departments until 1946 when he was appointed sales representative at Charlotte, North Carolina. Mr. Plant is a native of Minneapolis.

•

S-D Continues Coronet Deal

Smith-Douglass Co., Inc., Norfolk, Va., announced just before press time that it is proceeding with its agreement to acquire a majority of outstanding shares of Coronet Phosphate Co., which owns extensive reserves of phosphate rock in Florida.

S-D is reported to have mailed remaining stock-holders of Coronet an offer to purchase their shares at $250 each. Coronet is reported to have 25,000 shares of $50 per value capital stock outstanding.

•

Old Ag. Employee Dies

Andres N. Barnes, 68, formerly with American Agricultural Chemical Co., Carteret, N. J., died Aug. 27. He had retired only recently after fifty years of service with the company.

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PHILLIPS 66 NITROGEN SOLUTIONS are shipped in aluminum tank cars like the one shown here. To you this means a better product . . . no corrosion . . . more N per dollar!

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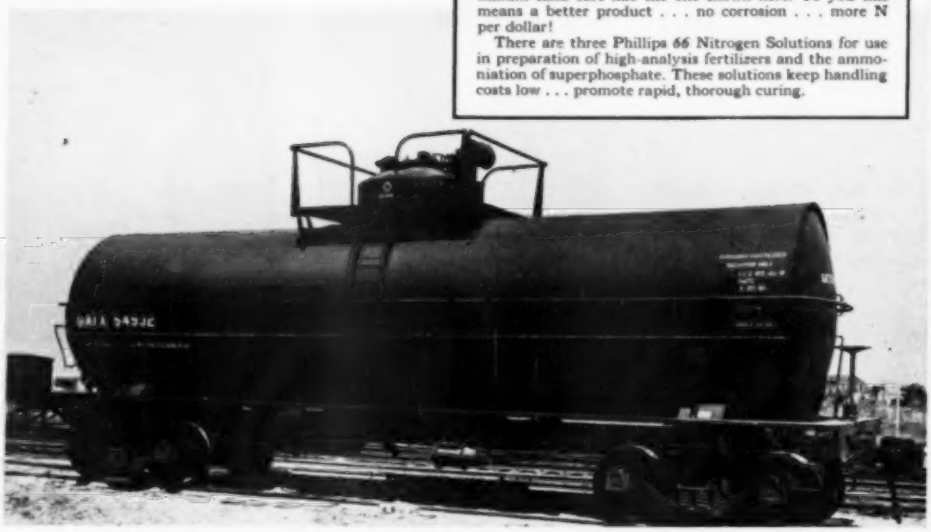

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OMAHA—WOW Bldg. • AMARILLO—First National Bank Bldg. • PASADENA—16 North Marengo Ave. • BARTLESVILLE—Adams Bldg.

David to Stauffer Co.

ROY S. DAVID

Stauffer Chemical Company has announced the appointment of Roy S. David as sales representative in the Export Department, based in Mexico and with his home office in Weslaco, Texas. Mr. David is a graduate of Baylor University, where he majored in business administration and specialized in foreign trade. He has traveled widely in South America and Spain where he lived for seven years. He was formerly with the Export Department of Universal Mills of Fort Worth, Texas.

•

New Office for Bagpak

The Bagpak Division of International Paper Co. has opened a new sales office in Kansas City, Kansas, to serve the industrial organizations in that area. O. W. McDuffie has been named to head the new office, located at 401 Kindelberger Rd., in the new plant opened earlier this year by the firm's Single Service Division.

•

Andrew Wilson, Mfgr., Dies

Andrew Wilson, 68, agricultural chemical manufacturer and chairman of the board of Andrew Wilson, Inc., died September 10 at Springfield, N. J. Mr. Wilson founded the firm which bears his name, some 40 years ago, but had not been active in its operation for six years.

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Int. Paper Appointments

The appointment of D. H. Kennedy as western sales manager, International Paper Company, Southern Kraft Division, to succeed the late Raymond Bee, has been announced by R. C. Doane, vice-president in charge of sales.

Mr. Kennedy joined International Paper Company at the Camden (Arkansas) mill in 1936. He transferred to the sales department in the Chicago Office in 1938 and in 1948 was appointed assistant to the western sales manager for the Southern Kraft Division.

Mr. Doane has also announced the appointment of J. D. Dooley as assistant western sales manager—kraft linerboard sales, and N. P. Sparkman as assistant western sales manager—kraft paper and bag sales.

•

Totman Reelected in Maine

When Hon. James Totman, assistant treasurer of Summers Fertilizer Company, returned with his family from France on September 22, he found he had been reelected a representative to the Maine State Lgislature during Maine's recent election. His term as mayor of Bangor, Maine, will expire December 31, 1952.

•

N. Y. State Conference Set

A three-day meeting is being planned for the 14th annual New York State Insecticide and Fungicide Conference and the fifth annual Pesticide Application Equipment Conference to be held at Ithaca, N. Y., November 11-13. Meetings will be held in Bibbins Hall, Cooperative GLF Exchange, Terrace Hill, Ithaca, it has been announced.

The conferences are a cooperative presentation among the Cornell University departments of plant pathology, agricultural engineering and entomology and the divisions of entomology and plant pathology at Geneva, N. Y.

The opening day, Nov. 11, will consider application equipment problems and the program for the following two days will be devoted to a review of the highlights on research and recommendations for the use of pesticides in New York State.

Serving on the committee in charge of the annual event are O. C. French, Dept. of Agricultural Engineering; G. C. Kent and J. M. Hamilton, Dept. of Plant Pathology; and Charles E. Palm and P. J. Chapman, Department of Entomology, all of Cornell.

New Chem. Research Head

DR. C. V. HOLLAND

Dr. Christian V. Holland has been named director of chemical research by Spencer Chemical Co., Kansas City, Mo. Dr. Holland was formrely coordinator of manufacturing facilities for Sterling Drug Inc. His headquarters will be at Pittsburg, Kansas, Spencer's general operating headquarters.

A native of Eastville, Va., Dr. Holland holds degrees from the University of Virginia, Johns Hopkins and M.I.T. During his association with Sterling Drug, Dr. Holland carried responsibilities in connection with plant facilities, quality control, safety practices and packaging. From September, 1951 until March 1952, on leave from Sterling, he served as deputy chief of the Drugs, Alcohol and Solvents Branch of the National Production Authority and chief of its Drug and Cosmetic Section.

•

N. Central AAEE to Meet

Meeting dates for the North Central States Branch of the American Association of Economic Entomologists have been set for March 19 and 20, at the Statler Hotel, St. Louis, Mo., according to Dr. J. W. Apple, University of Wisconsin, secretary of the Branch.

According to Dr. Apple, the meeting dates were originally set for a week later, but complications in the hotel's schedule made it necessary to move the meeting time ahead to the 19th and 20th. Detailed plans for the program will be published later.

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Joins Drum Chemical Co.

Herbert H. Handelmann formerly vice-president of Peter Henderson and Company has now joined Drum Chemicals, Inc., manufacturers of agricultural industrial products at Brooklyn, New York.

Having been associated with the business for thirty-three years, Mr. Handelmann served as secretary and director of the merged Peter Henderson, Stumpp and Walter Co. until his resignation. Mr. Handelmann, a resident of Ridgewood, New Jersey, will manage and operate the agricultural specialties division.

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AAEE Program Plans Made

A tentative program for the Philadelphia meetings of the American Association of Economic Entomologists has been issued by Dr. Ernest N. Cory, Univ. of Maryland, College Park, secretary of the group. The meeting, scheduled for December 15-18, includes joint sessions with the Entomological Society of America: the presentation of numerous papers on forest insect control, cereal and forage insects, fruit and vegetable pests and Medical entomology. The annual banquet will be held on Tuesday evening, December 16.

A business session to discuss consolidation of the A.A.E.E. and the E.S.A. is scheduled to be held Monday afternoon, with most of the submitted papers being presented Tuesday and Wednesday. Headquarters for the convention will be the Bellevue Stratford hotel in Philadelphia.

Southwest Potash Corp. Expands Facilities

Southwest Potash Corp., a subsidiary of American Metals Corp., has announced that it will increase the capacity of its potash plant at Carlsbad, N. M. and will go into production this fall, as previously scheduled. Production is expected to reach about 210,000 tons of K_2O per year, with further expansion possible, depending upon market conditions. The major facilities have been designed to enable rapid expansion to more than twice initial capacity, should the need arise, the company states.

New Officers, National Shade Conference

Officers elected by the National Shade Tree Conference for 1952-53 at the group's recent annual meeting in Boston, are pictured above. They are, (L to R): Dr. L. C. Chadwick, Department of Horticulture, Ohio State University, Columbus, secretary-treasurer; Albert W. Meseroe, The Albert W. Meseroe Co., Danbury, Conn., vice president; Dr. George S. Langford ,Department of Entomology, University of Maryland, College Park, Md., President; and Dr. Paul E. Tilford, executive secretary, National Arborist Association, Wooster, Ohio, editor.

The meeting was held August 18-22 at the Statler Hotel, Boston, as reported in September *Agricultural Chemicals*, page 79).

Appointed by Freeport

Leonard B. Gittinger has been appointed director of market research of Freeport Sulphur Company, it has been announced.

Mr. Gittinger joined Freeport in 1942 at the company's Grande Ecaille mine in Louisiana and has held various budgetary and statistical positions. He is a native of Chariton, Iowa, and a graduate of the Harvard School of Business Administration.

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Forms Foreign Department

Pittsburgh Coke & Chemical Company has organized a Foreign Department to direct all its overseas chemical sales operations, R. M. Marshall, president, has announced. Headquarters of the new department will be in the Empire State Building, New York City.

•

Mrs. Rhea, Mente, Dies

Mrs. Posey B. Rhea, wife of Issac T. Rhea, president of Mente & Company, Inc., died unexpectedly September 4, at Memphis, Tennessee. Mrs. Rhea had been a vice-president and director for many years of Mente, New Orleans Bag Company.

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PENTAHYDRATE BORAX

COMPOSITION Contains a minimum of 44% B_2O_3 or approximately 121% equivalent Borax.

ADVANTAGE More economical because the Borate in this form is more concentrated.

PURPOSE To correct deficiency of Boron in the soil.

RECOMMENDED USES As an addition to mixed fertilizer, or for direct application to the soil.

FOR CORRECT APPLICATION Consult your local County Agent or State Experimental Station.

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MURIATE OF POTASH

IMPORTANCE Muriate of Potash is a vitally important ingredient which provides the soil nutriment so essential in the formulation of good mixed fertilizers.

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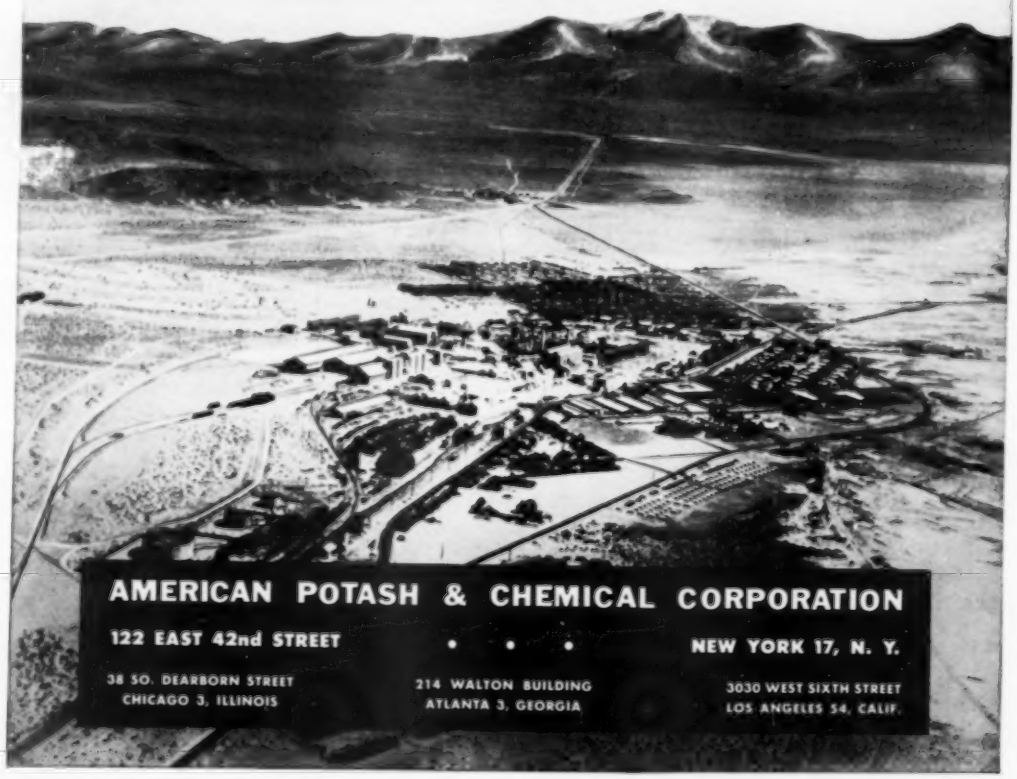
TO ASSURE EFFECTIVE RESULTS Specify "Trona" Muriate of Potash . . . made by the pioneer producers of Muriate in America.



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Johnson to Larvacide Co.

Larvacide Products Inc. has purchased the Insecticide Division of Innis, Speiden & Co., Inc. The new

CONRAD C. JOHNSON

company, Larvacide Products, Inc., will maintain offices at 117 Liberty Street, New York, under the direction of Conrad C. Johnson, president and former manager of the Insecticide Division of Innis, Speiden & Co., Inc. for the past 20 years. George S. Hamilton, former treasurer of Innis, Speiden & Co., Inc. will function as treasurer of the new company.

Larvacide Products, Inc., will supply all products currently furnished by the Insecticide Division of Innis, Speiden & Co., Inc. The plant in Niagara Falls will continue to manufacture Larvacide (Chloropicrin), while items not containing Larvacide will be produced in a modern plant in the New York area. Additional products will be announced in the near future.

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So. Ag. Workers to La.

The Association of Southern Agricultural Workers will hold its annual meeting in New Orleans, La., February 9, 10 & 11, it has been announced. General headquarters of the event will be at the Roosevelt Hotel. Detailed plans of the program have not been announced as yet.

•

USDA Extends Quarantine

Plant quarantine operations of the U. S. Department of Agriculture to safeguard the continental United States and its territories and districts from the entry of foreign insect pests and plant diseases, were extended to the Virgin Islands of the United States effective September 5.

Two inspectors of the Bureau of Entomology and Plant Quarantine have been transferred to the municipalities of St. Croix and St. Thomas, Virgin Islands, in an effort to give the Islands more adequate protection against introduction of injurious pests.

Pierce to Hercules

Henry F. Pierce, entomologist, will represent Hercules Powder Company's agricultural chemicals section

HENRY F. PIERCE

in the states of New Mexico, Arizona, the southern half of California, and the West Coast of Mexico, the company has announced. In his new assignment, Mr. Pierce will have headquarters in the company's Los Angeles office.

Before he joined Hercules in June, 1951, Mr. Pierce had several years experience in the agricultural chemicals field, during which period he traveled in Central and South America. Since being with Hercules, Mr. Pierce has worked on the applications of toxaphene insecticides, cooperating with county agents and the extension services of Pennsylvania, New Jersey, Delaware, and Maryland.

A native of New Jersey, Mr. Pierce received degrees from Penn. State College and Rutgers U.

New Trenton, Mo. Plant for Thurston

The new Trenton, Mo., plant of the Thurston Chemical Company is shown here. It has an annual capacity of 25,000 tons of mixed fertilizer and is the fourth of the company's plants. Other units are located at Joplin, Mo.; Tulsa, Oklahoma; and Lawrence, Kansas.

More than 8,000 visitors attended the formal opening of the plant on Saturday, August 9. Arnold W. Klemme, Extension Professor of Soils, University of Missouri, Columbia, was the featured speaker on that occasion.

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AS WE GO TO PRESS . . .

Freight Costs to be Added

Fertilizer wholesalers and retailers can now pass on their increased transportation costs, according to Supplementary Regulation 120 to the General Ceiling Price Regulation issued September 26 by the Office of Price Stabilization, Washington.

Up to this date, only manufacturers and certain retailers were permitted to increase prices in keeping with advanced transportation costs.

The regulation has no effect upon superphosphate sales because freight rate increases generally could not be passed on by superphosphate manufacturers or mixed fertilizer manufacturers who sold superphosphate in wholesale.

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Ammonia Group to Dallas

The Agricultural Ammonia Institute will hold its annual meeting at Dallas, Texas, December 3-5. Hotel Baker will be convention headquarters. Details of the December meeting were not available at press time but were expected to be completed within a short time. "Doc" Eldon, Continental L. P. Products Co., Dallas, is chairman of the arrangements committee.

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Four Control Groups Meet

Four groups of control officials were in a week-long session, September 29-October 4, at the Shoreham Hotel, Washington, D. C. as this issue went to press.

The Association of Official Agricultural Chemists was to meet the early portion of the week, with the Association of American Feed Control Officials meeting October 1 and 2. Following this group on October 3, the Association of American Fertilizer Control Officials were to meet and on Saturday, October 4, the Association of Economic Poisons Control Officials was to round out the week. Complete reports on new officers elected and on the programs will appear in the November issue of *Agricultural Chemicals*

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New Pitt. Ag. Appointment

GORDON M. WILLIAMS

Gordon M. Williams has been appointed assistant supervisor in the agricultural chemicals research section of the Pittsburgh Coke & Chemical Company Research and Development Department.

Mr. Williams is a graduate of Iowa State College, Ames, and attended the University of Chicago for graduate studies. He was associated for seven years with the Imperial Paper and Color Corporation, Glens Fall, New York, in its organic research division, and was more recently associated with the Holland Coke and Chemical Company of Holland, Michigan, as assistant to the technical director.

•

CFA Meeting in November

Details of the California Fertilizer Association's 29th Annual convention have been announced by Sidney H. Bierly, executive secretary. The event is to be held at the Desert Inn, Palm Springs, Calif., Nov. 10-12.

Featured will be several outlines illustrated with colored slides covering fertilizer tests conducted during the current year by the University of California, College of Agriculture, and Experiment Stations. The Soil Improvement Committee of the California Fertilizer Association will present the bulk of this program. The Bureau of Chemistry of the California State Department of Agriculture will present a report on its activities during the past year, and in addition will feature papers on the current rash of chemical soil conditioners, and on protection of plant employees against preventive accidents.

Speakers scheduled to appear on the program include Dr. Russell Coleman, president, National Fertilizer Association, Washington, D. C.; Paul T. Truitt, president, American Plant Food Council, Washington; John J. McElroy, University of California, Berkeley; Z. H. Beers, executive secretary of the Middlewest Soil Improvement Committee, Chicago; William E. Snyder, Wilbur-Ellis Co., Los Angeles; Weller Noble, president, Pacific Guano Co., Berkeley; and S. B. Tatem, Swift & Co., Los Angeles, CFA president.

Two receptions are planned. The first, Monday evening, will be sponsored by Balfour, Guthrie & Co., Ltd. and the other, Wednesday, by American Potash & Chemical Corp. The annual CFA banquet will be held Wednesday night.

More than 300 persons are expected to be present at the meeting, Mr. Bierly says. All of Tuesday has been set aside for recreational activities, with golf, swimming, trail riding, tennis, bowling, bridge and canasta, as well as browsing, available to the conventioneers.

•

Soil Conditioner Licenses

The Du Pont Company's Grasselli Chemicals Department announced on Sept. 26 that it has concluded arrangements licensing Du Pont to sell soil conditioners for use under patents issuing to the Monsanto Chemical Company.

Du Pont has been selling a soil conditioner since June under the name of "Du Pont Soil Conditioner W" through its established wholesalers and dealers.

Chapman Names McKinney

JOSEPH S. McKINNEY

Joseph S. McKinney has assumed his new duties as export sales manager of Chapman Chemical Company, Memphis, Tennessee, manufacturers of wood preservatives and agricultural chemicals.

According to C. F. Grafton, vice-president, Mr. McKinney will have charge of the sales and promotional work with distributor outlets, utilities, agricultural interests, and lumber industry. He will devote a large part of his time to traveling and working in territories abroad.

Mr. McKinney has been associated with Chapman for more than a year. He was formerly assistant sales manager of Getz Bros. and Company, San Francisco export firm and with the export department of the Dow Chemical Company, Midland, Michigan.

•

N. J. Fertilizer Conference

Both production and consumption of fertilizer materials will surpass all past records in the 1951-52 season, Paul T. Truitt, president of the American Plant Food Council, Washington, D. C., told attendants at the New Jersey Fertilizer conference on September 16. The conference is an annual event, held at the college of Agriculture, Rutgers University, New Brunswick. Mr. Truitt was one of a half-dozen speakers to appear on the all-day program.

According to Mr. Truitt's predictions, the total number of tons of fertilizer consumed in the U. S. in 1951-52 will exceed the previous year's figures by about 5½%, which would make the total in the neighborhood of 22 million tons. The upward trend will not stop next year, either, he said. Signs point to still another new production high of 10 to 15 percent over this year's production, he said. Despite these gains, shortages may occur because of constantly increasing demands.

Viewing the economics of fertilizer usage, Mr. Truitt said that fertilizer costs have advanced less than any of the essential items the farmer uses to produce a crop, except borrowed money. In his opinion, the farmer will have to spend more than 2½ cents per dollar of his total cash income for plant foods to keep food production up.

Dr. Firman E. Bear, chairman of the soils department at Rutgers, gave a detailed review of the current projects in his department. Among these, he said, are studies of soil conditioners, economic uses for wastes, responses of plants to trace elements, effects of hormones on plant growth, use of gypsum to control wet spots in fields, and others.

Farmers have been quick to accept liquid nitrogen solutions for direct application to the soil, according to William J. Exum of Allied Chemical and Dye Corporation, New York. Reporting his company's first-year experience with these materials, Mr. Exum stated that distributors for his company's product, "Nitrana," were appointed in 16 states and demand has been considerably in excess of supply. New production facilities are expected to improve the supply situation next year, he said.

Samuel D. Gray of the American Potash Institute, Washington, D. C., said that there are "limitless supplies" of potash. Furthermore, if natural deposits should ever be exhausted, it will be possible to extract potash from sea water, he stated. It is estimated that one cubic mile of sea water will yield 2,175,000 tons of potash.

Dr. E. R. Purvis of the State University Soils Department reviewed responses to a questionnaire sent to industry representatives concerning minimum grades of fertilizers to be included on the recommended list.

Dr. William H. Martin, dean of the College of Agriculture and director of the Agricultural Experiment Station, was chairman of the conference.

Chase Bag Names White

J. A. WHITE

The appointment of J. A. ("Doc") White as supervisor of sales in the Virginia-Carolina area has been announced by Chase Bag Company. The company has opened a new sales office at 6009 W. Broad Street in Richmond, Va. as headquarters for operations in that territory.

Mr. White has had more than twenty years experience in the bag business. He will handle sales of the complete line of products manufactured by Chase Bag Company, Chicago, Ill.

•

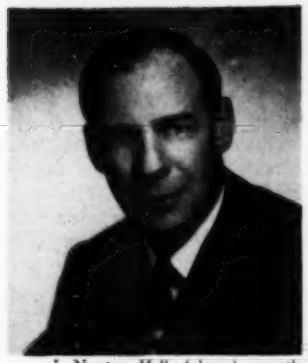
New Plant for Phillips

Phillips Chemical Company will construct a 405-ton-per-day triple superphosphate plant at Adams Terminal near Houston, Texas, according to an announcement by K. S. Adams, chairman, and Paul Endacott, president of Phillips Petroleum Company and its wholly-owned subsidiary. The plant is expected to go into operation late in 1953.

Raw materials will be phosphate rock shipped from Florida mines, and sulfuric acid, a part of which will be manufactured from sulfur produced by Phillips Chemical Company in West Texas.

This will be the company's fourth chemical installation on the site of the former Todd-Houston shipyard on the Houston ship channel. The others are an ammonium sulfate plant constructed in 1948, a methyl-vinylpyridine plant now nearing completion, and an anhydrous ammonia plant to be placed in operation late in 1953.

Heads New Chem. Firm



J. Newton Hall, (above) recently announced his establishment of Pioneer Chemical Associates in Denver, Colo. The company will act as consultants, brokers and marketers, specializing in insecticides and other agricultural chemcals. (See story, pages 99 & 132, September issue)

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Licenses Krilium Sellers

Seven companies already have been licensed to sell soil conditioners for use under patents issuing to Monsanto Chemical Company, it has been announced.

Licensed companies include American Chemical Paint Company, Ambler, Pa.; Associated Sales and Supply Co., St. Louis; Quinn Drug and Chemical Company, Greenwood, Miss.; Shelby Agricultural Chemical Company, Shelbyville, Ky.; Tennessee Corporation, New York, N. Y.; Thompson-Hayward Chemical Company, Kansas City, Mo.; and Wyandotte Chemical Company, Wyandotte, Mich.

Under the licensing program, formulators will use their own brand names but may make statements on labels to the effect that they are licensed under soil conditioner patents issuing to Monsanto.

Monsanto has also offered its improved soil conditioner resins for sale to licensed formulators and will provide customers with technical assistance including formulation and application information on the product sold.

Sales of Krilium soil conditioner by Monsanto's Merchandising Division through distributors and dealers on a nationwide basis, will continue to be expanded, the company says.

SUPPLIERS BULLETINS

(*Continued from Page 65*)

various sized spouts, and other information.

Both manual and air-operated bag holders are described and illustrated. Two pages of engineers' drawings and specification tables give dimensions, installation data, and utility requirements of the air operated types.

Copies of the bulletin (No. 0452) may be obtained from the Richardson Scale Co., Clifton, N. J.

•

Shaffer to Cyanamid

American Cyanamid Company has announced the appointment of Dr. C. Boyd Shaffer as industrial toxicologist in the company's central medical department. He will be in direct charge of toxicological investigations of all company products except chemotherapeutic and biological agents. He will work in close liaison with the company's Research Labs.

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Cotton Meeting This Month

The Beltwide Cotton Mechanization Conference is to be held later this month at Bakersfield-Shafter-Fresno, California. The conference is to hear discussions on weed control, defoliation, and insect control, according to Claude L. Welch, Memphis, Tenn., director of the production and marketing division, National Cotton Council, sponsor of the conference. Scheduled to appear on this program is Dr. R. L. Lovvorn, in charge of weed investigations, U. S. D. A., Beltsville, Md.

NAC SIDELIGHTS

(*Continued from Page 39*)

cranked up his cab, and even dropped the price a five spot because of the poor season.

XXXX

Gene Heckathorn was among the representatives from the west coast. He reported that his company has recently been on the receiving end of some disturbing legal activity. Seems that a pregnant woman had a miscarriage and blamed the odor from Heckathorn's insecticide mixing plant. Finding the insurance company willing to talk settlement, the lawyer handling the case promptly popped up with a half dozen more suspiciously similar cases. Now if Gene can only put the odor up in some sort of pill's—that can be depended on—he can forget the insecticide business.

PHYTOPATHS MEET

(*Continued from Page 44*)

of parathion, TEPP, "Systox" and "Selenium" as they did in distilled water. Further tests in the vaporphase of these toxicants indicated that mortality was directly proportional to the concentration of Systox, parathion, Malathon, EPN and TEPP. OMPA and Selenium (as sodium selenate solution) were not nematocidal in this test, he said.

Colloquium Held

THE Fungicide Colloquium, held after the Phytopath banquet of Tuesday night, featured speakers representing the pesticide industry in the U. S. and also a number of areas outside the country. Lea S. Hitchner, executive secretary and treasurer, National Agricultural Chemicals Association, Washington, D. C., warned the group that if Congress should pass the Miller Bill and other legislation expected to be introduced at its next session, growers as well as the agricultural chemical industry, will be hampered eventually through the cutting down of research. He said that adequate laws are already on the books for protection of the public from possible harm from pesticidal residues, but these laws have not been brought into full play.

Chairman L. Gordon Utter, Phelps-Dodge Refining Corp., New York, then introduced speakers to give information on the use of fungicides outside of the United States. Norwod C. Thornton, United Fruit Co., La Lima, Honduras, told about plant disease conditions in Central and South America, saying that without the control of disease there, no crops could be harvested in marketable condition. He said that the potential demand for fungicides in South America is tremendous, but before this can be realized fully, steps must be taken to overcome ignorance and superstition on the part of native growers. They "control" disease by planting crops at the right time of the moon and attempt to eradicate insect pests by burning off large areas . . . neither of which is effective. Coffee plantations, he said, offer the largest potential for bordeaux mixture and for the dithiocarbamate fungicides.

In the case of bananas, if no control measures are taken, the entire crop is usually lost within six months from Sigatoka disease (leaf spot) he said.

L. R. Reed, Plant Protection, Ltd., Fernhurst, England, told about the use of fungicides in Europe. He said that broad acreages are under bordeaux control at present and that systemic fungicides are coming into prominence. Seed treatments are widespread, with the mercurials rating first place.

Two Indian students now attending the University of Minnesota, discussed briefly conditions in Asia. These two, Sheodhan Singh and Syed Ali, answered questions regarding operations in both India and Pakistan. It was brought out that so far, fungicides are not used by farmers themselves, but instead, are applied by government agencies. The area is in great need of information to be brought down to the level of users who for the most part are in complete ignorance of plant disease control.

Reading excerpts from the Insecticide, Fungicide, Herbicide and Rodenticide Act of 1947, E. A. Walker, U. S. Dept. of Agriculture, Washington, D. C., explained to the group the many details to be observed in manufacturing, marketing and applying fungicides. He told of the machinery set up by the U.S.D.A. for testing of fungicidal materials and informed his hearers of matters considered to be of most importance by the agency.

As a change of pace, W. A. MacLinn, New Jersey Agricultural Experiment Station, New Brunswick, told the group about taste panel studies on fungicides being conducted at the Station. He revealed some of the difficulties in selection of a panel; of arriving at an intelligible answer to complex questions and of the scales developed in order to classify and judge the manner in which the fungicide has or has not affected the taste and texture of various fruits and vegetables.

A two-speaker panel on problems of formulation from the standpoints of manufacturers and applicators was presented next. Dr. J. B. Harry, Carbide & Carbon Chemical Div., New York, presented the numerous questions which must be answered before a formulation can be manufactured with success. Problems covered toxicity, adhesive properties, effectiveness in the field, storability and the final selling price. With so many variables involved Dr. Harry said, the manufacture of formulations is more of an art than an exact science.

The problem from the standpoint of the applicator was discussed

by H. T. Hilborn, Maine Agricultural Experiment Station, Orono, Maine. He pointed out that many of the problems facing the manufacturer are passed on to the applicator who must get exactly the correct amount of fungicide on the plants, striking between too little and too much.

Problems of corrosion of metal parts, rubber hoses and tank linings are always with the applicator who deals with different formulations, Mr. Hilborn said, and operators are faced further with possible hazards from inhalation.

Dr. E. C. Stakman, University of Minnesota, St. Paul, Minn., spoke on chemical control of wheat rust, comparing the use of control materials with the raising of resistant varieties of wheat. He said that much work needs to be done regarding both the use of chemical fungicides and the economics involved. Wheat rust can be controlled by chemicals, he said, but the method is far from perfect at the present.

To conclude the formal talks on the colloquium, APS president McNew reported on the work of the Food Protection Committee of the National Research Council, of which he is a member. He recalled its efforts to keep the public correctly informed about chemicals in food at the time when many irresponsible articles were appearing in newspapers and magazines, tending to frighten the public. He termed as regrettable the failure of the Delaney Committee to heed competent testimony while at the same time publicizing the unscientific talk of much less qualified witnesses.

As is customary, industry representatives were invited to present to the colloquium, new fungicidal materials hitherto unannounced. The following were presented:

Stauffer Chemical Co., New York, introduced two experimental materials, "Experimental Fungicide-Nematocide Compound N-244" and "Experimental Fungicide-Nematocide Compound N-521"

No. 244 is described as 3-p-chlorophenyl-5-methyl rhodanine, a yellow crystalline material having a melting point of 106°-110° C. Dosages of 5ppm and higher gave 100% control of root-knot nematodes, it was stated, and the material shows promise of low phytotoxicity. Limited quantities are available for laboratory and small field experiments.

Compound 521 is 3,5-dimethyl - tetrahydro-1,3,5,2H - thiadiazine-2-thione, a nearly odorless, white crystalline solid having a melting point of 100°-103° C. (with decomposition) It appears to have both fungitoxic and nematocidal properties, according to tests made thus far.

Limited foliage tests have shown no unusual phytotoxicity hazards resulting from wettable powder sprays; soil treatments have shown considerable toxicity to seeds when planted in soil sooner than one week after application; but there was no toxicity to seeds planted one week after treatment.

The material is available for laboratory and small field tests. Both

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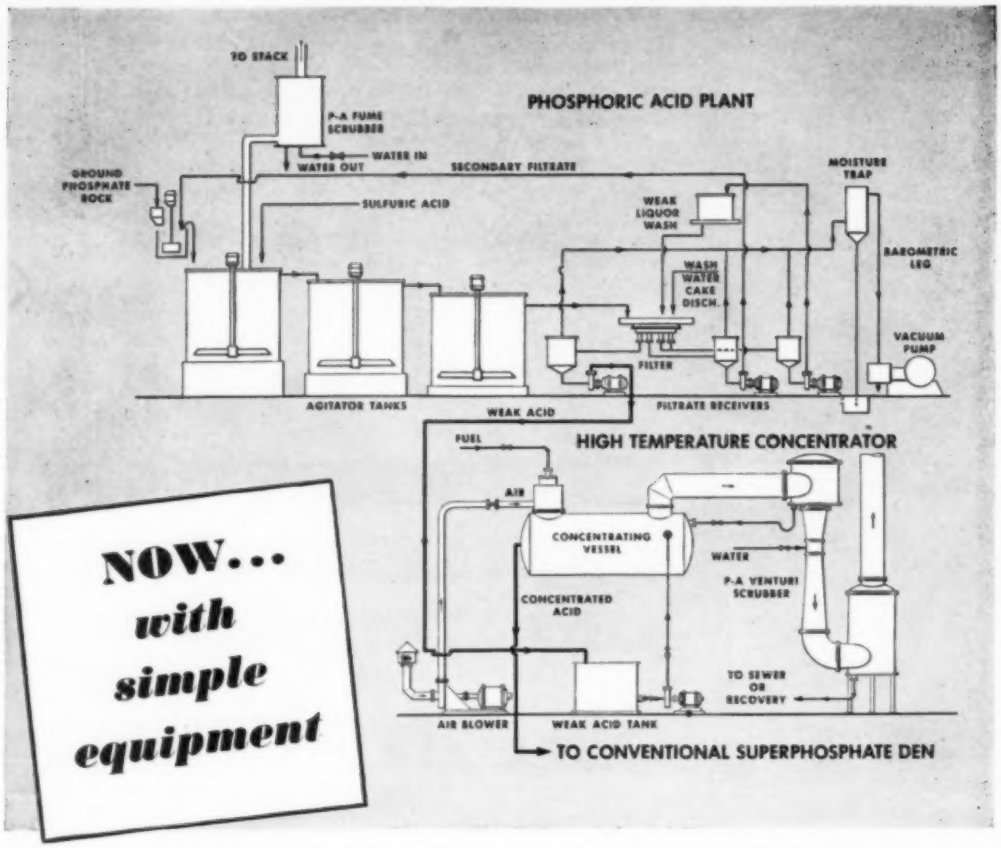

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compounds 244 and 521 are available at the company's home office 420 Lexington Ave., New York 17, NY.

Ethyl Corporation presented information on its experimental fungicide "B-622," 2,4 - dichloro - 6- (o-chloroanilino)-s-triazine, said to be effective against early blight of tomato and potato, in greenhouse experiments. Phytotoxicity of the compound is slight, injury having been reported only on occasional greenhouse-grown tomato plants and on apple in the field. Improper formulation was regarded as a contributing factor to the injury, it was stated.

Samples for testing are available from the Ethyl Corporation, Product Development, 100 Park Ave., New York 17, N. Y.

The Upjohn Company presented "Acti - dione Ferrated," an antibiotic fungicide for control of dollar spot, rose mildew, cucumber scab and cherry leaf spot. It is also used as a seed treatment. The material is available in a dual package consisting of one vial of 9 gm. of "Acti-dione" and one bottle of 8 oz. of ferrous sulfate. Write the Upjohn Company, Chemical Sales, Kalamazoo, Mich.

Phelps-Dodge Refining Corporation introduced its organo-copper fungicide, a copper sulfide xanthate compound containing 50% metallic copper. It is said to be effective against early blight of tomato, and unlike other compounds, increases in fungicidal effectiveness the first 3-4 days following application. Preliminary tests have shown the material to have promise in emulsion formulations. It is being offered for experimental testing for aerosol, emulsion and concentrate formulations. Requests should be sent to Agricultural Technical Service, Phelps Dodge Refining Corp., 40 Wall St., New York 5, N. Y.

Phelps Dodge also presented a similar material in copper paste form, for vegetables. It is also available in sample quantities. ★★

ACS MEETING

(Continued from Page 52)

for use in predicting or controlling these habits, a valuable aid in pest control.

New Superphosphate Processes

OTHER papers dealing with fertilizer subjects were presented at sessions of the Division of Fertilizer and Soil Chemistry on Sept. 18th and 19th. S. F. Thornton of F. S. Royster Guano Co. presided at the Thursday morning session which featured two papers by personnel of the Tennessee Valley Authority,—dealing with the manufacture of superphosphate. The first of these paper reviewed the acidulation of rock phosphate with mixture of sulfuric and phosphoric acids and with phosphoric acid alone, and the other covered partial replacement of sulfuric acid with nitric acid in the manufacture of superphosphate. There has been great interest in the partial replacement of sulfuric acid in super manu-

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facture during the past year or two because of the sulfur shortage. The use of phosphoric acid has also been given added attention because of the Atomic Energy Commission's interest in phosphoric acid as an important source of uranium. Abstracts of these two papers follow:

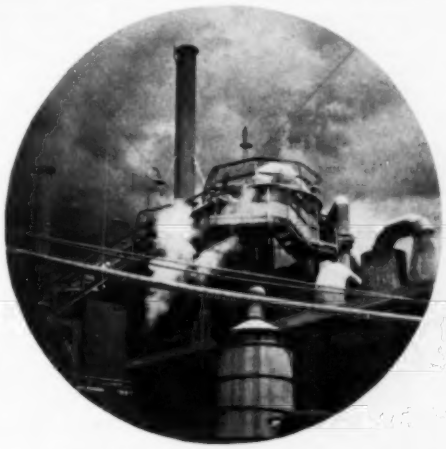
"Superphosphates By Acidulation of Rock Phosphate With Mixtures of Sulfuric and Phosphoric Acids and With Phosphoric Acid Alone." L. D. Yates and F. T. Nielsson, Tennessee Valley Authority, Wilson Dam, Ala., and E. J. Fox and R. M. Magness, U. S. Department of Agriculture, Beltsville, Md.

Over a period of years there has been considerable interest in the acidulation of rock phosphate with mixtures of sulfuric and phosphoric acids and with phosphoric acid alone in ordinary superphosphate equipment. The higher grades of superphosphate thus obtained are needed in the formulation of high-analysis mixed fertilizers, for which there is an increasing demand. The use of phosphoric acid, either with or without sulfuric acid, in manufacturing facilities designed for sulfuric acid treatment was re-emphasized by the Atomic Energy Commission's recent proposal to increase the production of phosphoric acid for uranium recovery. At the request of the Atomic Energy Commission, a study of the production of superphosphates containing 28, 33 and 45% available P_2O_5 was undertaken cooperatively by the U. S. Deparmtent of Agriculture and TVA. The work is still in progress.

In small-scale experiments 12-pound batches of Florida land pebble (88%—100 and 57%—200 mesh) were acidulated in a change-can mixer at various temperatures and acid concentrations. The conversion of the rock P_2O_5 to available forms during a 24-hour denning period varied from 95% for ordinary superphosphate to 85% for triple superphosphate. The period of fluidity in the acidulate made with mixed acids was greater than with single acids. Limited reaction during the initial stage, indicated by longer periods of fluidity, had little or no effect upon the extent of reaction 24 hours after mixing.

Results of pilot-plant experiments with a 1-ton pan mixer and a 1-ton mechanical den indicated that the compositions and temperatures of acidulations shown in the following tabulation would be satisfactory for use in the production of superphosphates containing 28, 33, and 45% available P_2O_5 in ordinary superphosphate mixing and denning equipment.

Grade of Product, % Available P_2O_5	Acidulant			
	Composition, %			Temperature °F.
	H_3PO_4	H_2SO_4	H_2O	
28	22.2	44.4	30.4	130-150
33	37	37	21	130
45	72		22	130



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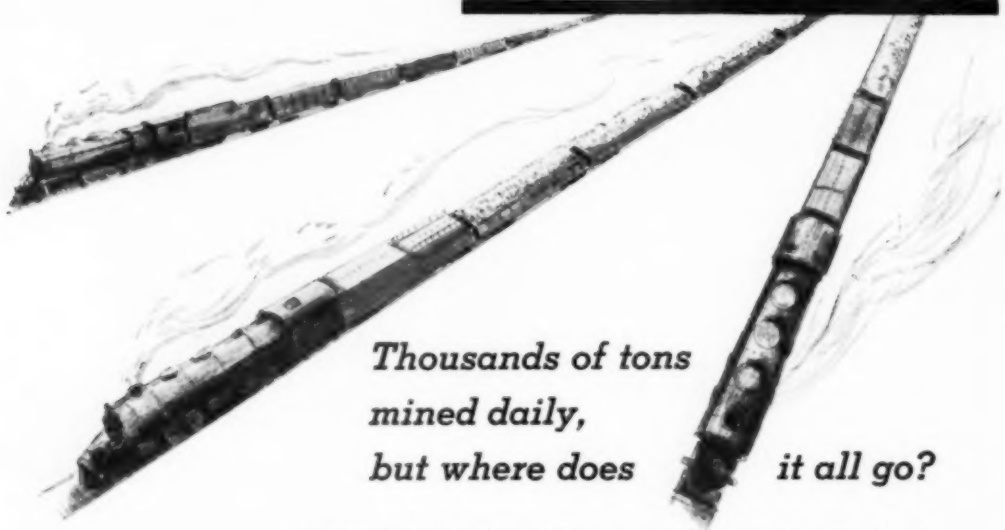

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Phosphoric acid made by the wet process was used. Cured products had 98% of their P_2O_5 contents in the available form and appeared dry and free flowing. The ammoniating and curing characteristics of the superphosphates were determined.

"*Partial Replacement of Sulfuric Acid With Nitric Acid In Making Superphosphate.*" David McKnight, J. F. Anderson, Jr., M. M. Striplin, Jr., and T. P. Hignett, Tennessee Valley Authority, Wilson Dam, Ala.

When rock phosphate was acidulated with mixtures of nitric and sulfuric acid containing about 30% water, the product solidified, and after 10 to 30 minutes it was a friable solid resembling fresh superphosphate. About half of the sulfuric acid required to make ordinary superphosphate was replaced by nitric acid. Two days' curing time was required to develop maximal P_2O_5 availability which was 98% when the acid-rock ratio was equal to that stoichiometrically required to convert all the calcium in the rock to calcium sulfate, monocalcium phosphate, and calcium nitrate. After curing, the product was ammoniated in a drum mixer with anhydrous, gaseous ammonia.

A typical product contained 6% nitrogen and 18% available P_2O_5. About 30% of the P_2O_5 was in a water-soluble form. The product appeared to have satisfactory physical properties and did not require drying.

Unlike previously developed processes that use nitric acid for acidulating rock phosphate, the present process may be carried out in equipment similar to that used for producing and ammoniating ordinary superphosphate. Either a batch, pan-type mixer or a continuous, funnel-type mixer was satisfactory for carrying out the acidulation step.

The results are considered to be technically and economically promising. Development on a pilot-plant scale is being continued.

F. T. Tremblay of the Western Washington Agricultural Experiment Station, Puyallup, Wash., and K. E. Baur, Pacific Supply Cooperators, Portland, Ore., offered a paper dealing with "Effect of Solubility of Phosphate Fertilizers on the Yield of Vegetable Crops." During 1948-1950 a number of annual vegetable crops were fertilized with rock phosphate, defluorinated rock phosphate, calcium magnesium phosphate glass, and superphosphate. The use of superphosphate resulted in substantially higher yields than were obtained when the other water-insoluble phosphates were used.

The use of ammonium citrate-soluble materials, defluorinated rock phosphate, and calcium magnesium phosphate glass, resulted in higher yields than were obtained from the use of rock phosphate which is largely insoluble in ammonium citrate.

In 1951 studies with vegetable field trials were enlarged to include some of the other phosphate sources. On basis of yield data obtained, the phosphate sources studied fall into the following sequence: diammonium phosphate=concentrated

Stauffer
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The results obtained in these studies indicate the need of a critical re-examination of the relative values of water-insoluble and water-soluble phosphates for rapidly growing vegetable crops grown under the soil and climatic conditions that prevail in western Washington.

"Foliar Applications of Plant Nutrients to Vegetable Crops" were reported on by R. L. Isaacs, Jr., and J. B. Hester of the department of agricultural research of Campbell Soup Co., Riverton, N. J. Spray tests to find out whether phosphorus and nitrogen compounds could be supplied to tomato plants growing in poor soil by absorption through their leaves showed that the plants did absorb the nutrients but sacrificed them to the phosphorus and nitrogen-deficient soil. It was also observed that nitrogen and potassium are washed out of the leaves of tomato plants during excessive rainfall.

"It has been reported in the literature that considerable plant nutrients (nitrogen, phosphorus, potassium, and particularly magnesium) are absorbed through the leaves and stems of the plants," said the report. "There is no question about this being true. It has been observed by the authors that nitrogen and potassium also leach from the leaves of the tomato plant during excessive rainfall. So, it is not a one way phenomenon.

"Investigations were initiated to ascertain if tomato plants grown on soils poorly supplied nutrients and showing both phosphorus and nitrogen deficiencies could absorb plant nutrients through the leaves. Using a Tifton sandy loam with an acid soil reaction and a depleted phosphorus and potash condition, tomato plants grown without fertilizer in the row were sprayed with complete mixtures (specially prepared 7-7-14 mixture, 10-52-17, and 13-26-13) as well as urea alone. The plants absorbed the plant nutrients but sacrificed them to the soil. It is obvious that there is a competition between the soil and the plants for certain plant nutrients, particularly phosphates.

"The soil must be supplied with phosphatic materials in order for the plant to be able to utilize the nitrogen and potash in the form of spray material. Perhaps much of the literature on the subject of the ready absorption of the nutrients, particularly phosphate, is based on sand culture work where there is no competition between the plant and soil.

"In conclusion it can be safely stated that nitrogen sprays can be effectively utilized as a supplemental method of fertilization."

Other papers presented before the Division of Fertilizer and Soil Chemistry included the following: "Scrubbing Systems for Fluorides in Superphosphate Plants" by A. B. Pettit, Davison Chemical Corp., Baltimore; "Chemical and Physical Properties of Ammoniated Superphosphate" by F. L. Turbett and J. G. MacArthur, Spencer Chemical Co., Pittsburg, Kan.: "Mining and Processing of Borates in California" by M. H. Pickard, Pacific Coast Borax Co., New York; "Chemical Method for Available Fertilizer Nitrogen in Urea - Formaldehyde Compositions" by W. A. Morgan and R. D. Kralovec, E. I. du Pont de Nemours & Co., Wilmington; and "Radiochemical Measurement of Reaction Rates of Liming Materials in Soil." by Donald H. Smith, James M. Blume, and Colin W. Whittaker, U. S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Md.

SAFETY

(Continued from Page 53)

Blasting. Mr. Withey.

2:30 "Housekeeping in Fertilizer Plants," E. O. Burroughs, F. S. Royster Guano Co., Norfolk, Va.

2:50 "Gas and Dust Control,"

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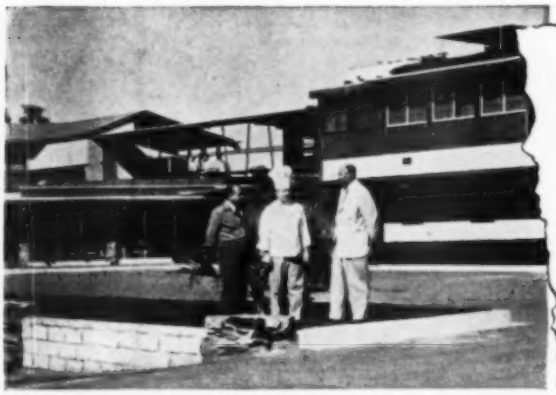

STOCKYARDS RESTAURANT – Located right in the heart of Phoenix's stockyards, Buell Warren of the Tovrea Stockyards Restaurant has one of the toughest fly control problems in the restaurant business. But by frequent sprayings with Pyrenone in the restaurant, kitchens, Cattlemen's Club and near the entrances, Mr. Warren has found the answer to his problem and is very pleased with the results.

STOCKYARDS FOR PEN-FEEDING – The stockyards for pen-feeding of cattle at Phoenix is recognized as the world's largest, with some 35,000 cattle usually on hand for 30, 60 or 90-day feeding. How the stockyards reduced spraying costs from 16 man-machine hours and $700 of other insecticides per day to only 1½ man-machine hours and $104 of Pyrenone spray *and achieved superior fly control* is proof again that you should make sure the insecticides you use are based on Pyrenone.

Spray Keeps State Fair Free Of Flies

ONE of the most remarkable instances of fly control was accomplished at the recent Arizona State Fair at Phoenix, Ariz. Countless visitors, among the estimated attendance of 175,000, remarked that this was the first time when the cattle and sheep barns at the Fair were totally without flies.

The remarkable part about it was that, although several million cubic feet of space were sprayed daily in the stock exhibition barn, this fly control only cost an average of two cents per animal. It figured out to a commercial cost of a gallon of spray a day, or about $18.

The insecticide used was Pyrenone, a combination material consisting of pyrethrum and piperonyl butoxide, and it was applied by use of a fog generator.

The cattle barn in particular, where actual counts were made, was almost without any fly population during the Fair days. And there was so much interest in the fact among visiting farmers and ranchers, that special radio and television programs were put on the air in regard to this demonstration of fly control.

STATE FAIR – Success of Pyrenone in controlling flies on a tough assignment was reported in *Arizona Stockman.*

Pyrenone*

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Division of National Distillers Products Corporation
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Branches in Principal Cities.
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Herbert Walworth, Lumberman Mutual Casualty Co.

3:20 "How to Conduct a Safety Meeting," T. J. Clarke, GLF Exchange, Ithaca, N. Y.

3:50 p. m. "Fire Prevention in Fertilizer Plants Through Maintenance," G. G. Blair.

According to J. Lauren Shopen, safety director, Consumers Cooperative Assn., Kansas City, Mo., the multiple-shot blasting demonstration on October 23, will be one of the most interesting in the history of the National Safety Congress.

As an example of a multiple shot, he described the result of a recent shot as follows: Mixed goods stored from 20 to 22 feet deep, in a bay 24 feet wide, bookshelf-type bulkheads on either side, were blasted with 39 sticks of powder, placed in fill holes and fired with three stages of delay. The pile before the shot presented a typical pile face without overhang or visible hazard.

After the shot, the product was very thoroughly fragmented with no large lumps. The shot had conditioned approximately 175 tons and the blasted product inclined from the floor level to the top of the pile very evenly over a distance of about 30 feet, making the face of the pile flatter than the angle of repose. There were no overhangs nor other hazardous conditions present.

Because of a number of advantages, the multiple shot method is declared to be worthy of serious consideration, but should not be attempted without expert coaching in the technique of handling, it is pointed out.

CFA STORY

(*Continued from Page 34*)

tilizer plant, Swift also operates a pesticide unit which produces a complete line of "Gold Bear" insecticides, weed killers and fungicides for use in that area.

One of the features in the Swift set-up of which manager Tatem and assistant manager R. W. Finch are particularly proud, is the "Growers' Advisory Service Laboratory" maintained by the company as a service for its customers. Upon request from a grower, a trained field representative is sent out to discuss the problem at hand and to take soil samples as well as to learn the history of the plot as to crops grown, yield obtained, prior plant food applications, insect pests, diseases etc. The sample is then taken back to the laboratory and tested for its content of N, P, and K, its pH and salinity and secondary elements. From the information gained, a plant food recommendation is then made. The laboratory services 12 California counties as well as part of Nevada and all of Arizona. Permanent files are kept for more than 10 years. In charge of the laboratory is L. W. Davis, director of Swift's advisory service who with his assistant, Ralph Boatman, keeps the work moving.

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makes a 9-18-16-2 grade for carrots, avocados and strawberries; a 13-13-13 for tree crops and vines; a 14-14-7 for truck crops and a pasture special 10-20-10. The most popular ratio used in California according to Mr. Tatem, is a 2-2-1.

Essentially the same set-up is in operation at the Hayward plant where M. C. McNeil is the manager and Ed Hobson is in charge of the soil laboratory. Here, servicing northern California and Nevada, a compact plant produces mixed goods which are shipped out conveniently either by truck or by rail.

The same facilities for testing soil are also a part of the Hayward operation.

Manufacturers of liquid fertilizers, the Liquinox Co., Orange, California, is doing big business in its area. According to Henry C. Garner, managing partner of the concern, liquid fertilizer is now accepted widely by ranchers who have come to recognize the assets of this method of application.

"Liquid fertilizers are generally extremely acid in nature," Mr. Garner explains, "to combat the alkalinity of former desert soils. They are delivered to the ranches in kegs, and lined bulk tanks and are metered into the irrigation water at rates based on the amount to be applied per acre and the time of the irrigation."

It was explained that liquid fertilizer is not a substitute nor replacement of dry fertilizers, but rather a supplement for controlled feeding and for use at a time of growth when the application of dry fertilizers is not possible. "Dry fertilizers are usually used at the time the land is being prepared for planting and by sidedressing, during the first stages of growth. Then liquids are applied to give small but frequent quantities of plant food during the growing season," Mr. Garner points out.

Like dry fertilizer, liquid materials must comply with state control laws as to labelling and guaranteed plant food analysis. The fact that the fertilizers must be in solution brings them within the limits of the chemistry of solubility and generally the highest analysis of plant food offered for sale in liquid form is 10-10-5, 15-8-4, 0-10-12 or similar grades. Instead of using water for "filler," Liquinox uses an organic extract produced from yucca, which grows on the deserts of California and Arizona.

With the allotted time gone, the final call in Los Angeles was at the California Sun Fertilizer Company. Here genial Jim Quinn, a former president of the CFA, operates his business as owner, with the capable assistance of E. R. Lindberg, manager. Mr. Quinn is happy to escort visitors through his modern plant, particularly to show them the Syntron vibrator situated between the hopper and bagger to prevent segregation of particles. He says that it adds greatly to the over all efficiency of the plant.

Trucks belonging to customers drive in and load up with bagged material, and the company trucks also transport the finished product to locations in the area. A rail siding is used of course, for bringing in raw materials.

In order for *Agricultural Chemicals* to meet some of the CFA

For ammonium sulphate
you can count on Koppers!

Koppers offers a good commercial grade of ammonium sulphate—the ingredient that is so essential to fertilizer because of its high nitrogen content.

CHARACTERISTICS — Koppers Ammonium Sulphate comes in crystals with low free-acid and moisture content. The nitrogen content is guaranteed to be not less than 20.5%.

SHIPMENT— From St. Paul, Minn. and Kearny, N. J., Koppers Ammonium Sulphate is shipped in 100 lb. and 200 lb. bags—also in boxcars and trucks. From Granite City, Ill. and Midland, Pa., it is shipped only in boxcars and trucks.

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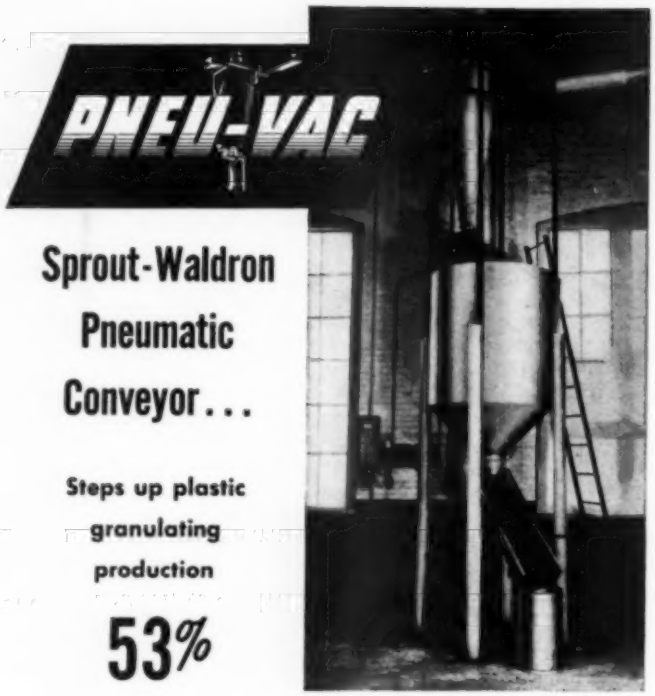

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OPERATION: Plastic sheets are fed into a high speed rotary granulator where they are cut into small cubes. At this point, cubes drop into chamber directly under revolving blades, are picked up by a Sprout-Waldron PNEU-VAC pneumatic conveying system. They are then lifted to a storage bin by air, screened to eliminate fine slivers, and finally bagged for storage.

RESULT: The continuous removal of the material from the granulator prevents machine from over-heating, thus making it possible to maintain full production. Prior to the PNEU-VAC INSTALLATION, top granulated capacity was 650 lbs./hr.

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Perhaps your conveying problem is also a "natural" for PNEU-VAC. But, regardless of your immediate needs, you should investigate this new, low-cost and efficient method for handling materials by air.

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SW SINCE 1866

SPROUT-WALDRON

PNEUMATIC CONVEYORS

people socially, Mr. Bierly arranged a luncheon at the Los Angeles Central Manufacturing District Club, and invited representatives of the companies in the area. Present on this occasion, in addition to Mr. Bierly, were the following: R. T. Finch and O. D. Wollcott, Naco Fertilizer Co.; Weller Noble, George Bloxham, Wallace MacFarlane and H. G. Conley, Pacific Guano Co.; M. E. Martin and Joe Kinsman, Leffingwell Chemical Co.; Fred R. Little, Globe Fertilizer Co.; Walter Houser, Southern California Fertilizer Co.; James M. Quinn, California Sun Fertilizer Co.; S. B. Tatem, Swift & Co.; and Ernie Hanson, Simplot Fertilizer Co., Pocatello, Idaho.

A similar luncheon was held a few days later at the Clift Hotel in San Francisco, to bring together some of the CFA people of that area. Present at this session, in addition to secretary Bierly and the *Agricultural Chemicals* representative, were Harold E. Ferguson, Naco Fertilizer Co., San Francisco; W. L. Dixon, Jr., Best Fertilizer Co., Oakland; O. D. Wolcott, Naco; C. H. Haas, C. H. Haas Co., San Francisco; Murray C. McNeil, Swift & Co., Hayward; and Ralph Crum, Pacific Guano Co., Berkeley.

NAC MEETING

(*Continued from Page* 39)

to 95,000,000 pounds of 12% material. These figures may be compared to domestic use of 80,000,000 pounds in 1950-51.

Requirements for aldrin, chlordane, dieldrin, heptachlor and toxaphene will be at least 65,000,000 pounds, and possibly as much as 90,000,000 pounds. Since this group lacks as broad a use base as DDT, minimum and maximum requirements should exhibit a wider spread than the requirements of DDT, he pointed out.

Other probable requirements of insecticides include from 5,500,000 to 6,500,000 pounds for parathion; 20 to 30 million pounds of lead arsenate; 15 million to 40 million pounds of calcium arsenate; 8 to 10

million pounds of pyrethrum flowers; and 7 to 10 million pounds of rotenone-bearing roots.

Efforts to conserve sulfur are reflected in estimates for use of from 356,300 to 423,000 pounds in 1952-53 as compared to use of 538,592 pounds in 1949-50 and 400,000 pounds in 1950-51.

Requirements for copper sulfate are estimated at between 90,000,000 and 105,000,000 pounds, and the dithiocarbamate fungicides are expected to be needed in the amount of 20,000,000 pounds in 1952-53.

With use of 2,4-D and 2, 4,5-T on the increase, requirements for the latter are expected to be at least 28,000,000 pounds and perhaps as high as 32 million pounds. At least 5 million pounds of 2,4,5-T will be needed, as compared to 2,822,000 pounds used in 1951-52.

Dr. O. V. Wells, chief, Bureau of Agricultural Economics, U. S. Dept. of Agriculture, Washington, followed Dr. Shepard to talk on "Agriculture and Technological Improvement." He laid stress on the necessity of maintaining continuous technological improvement, emphasizing the importance of research and related educational and technical-assistance activities. The complexities of modern agriculture were pointed out, using as an example the cotton farmer who finds that his crop is being destroyed by insects. "First, he must decide if they are boll weevils, bollworms, cotton aphids, cotton fleahoppers, cotton leafworms, cutworms, fall armyworms, garden webworms, grasshoppers, pink bollworms, spider mites, thrips or something else. Then he must decide whether to use aldrin, BHC, calcium arsenate, chlordane, DDT, dieldrin, heptachlor, lindane, methoxychlor, nicotine, parathion, rotenone, sulfur or toxaphene," the BAE chief said. Thus, the farmer, in order to do his job efficiently, must possess a large amount of technological "know-how," which in turn underlines the demand for better educational and technical-assistance directed toward the farmer.

Dr. Wells declared that the farmer is a part of the business world, and that technological improvement is by no means cost-free. "Not only is commercial farming an increasingly complex, costly business in terms of requiring substantial cash outlays, but it is likely to become more so in the future," he said, adding that he saw little reason to expect that costs are likely to decline relative to farm prices.

Dykstra Speaks

SPEAKING on "Conservation Programs and Pesticides," Walter W. Dykstra, assistant to the chief, Branch of Predator & Rodent Control, Fish & Wildlife Service, U. S. Dept. of Interior, reviewed the history of various toxicants used to control rodents and other unwanted pests throughout the world.

He reported that since 1943, when investigations concerning effects of DDT on fish and wildlife were initiated, voluminous data have been assembled concerning results of using

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DDT and other chemical compounds. "In examining these findings," he said, "It is gratifying to note that none of the new potent poisons have created 'biological deserts' envisioned by some individuals. In fact, it is encouraging to see the mounting evidence that indicates most of these materials can be applied in a manner which is both effective in combating pests and also of little detriment to beneficial forms of animal life. For instance, toxicity of DDT to birds and fish is greatly increased when an oil carrier is employed, but this danger is materially reduced if the chemical is applied in water solutions or as a dust. In general, mammals are most resistant to DDT, birds are next, amphibians, reptiles, and fish are least resistant.

"Furthermore, the young of each species are usually much more susceptible than are adults. Knowing this, the applicator can further reduce potential hazard by making spray applications during seasons when young are not present and by using the minimum amount of toxic chemicals required to control insect pests. In many instances, one pound or less of DDT per acre will accomplish this with very little harm to wildlife, whereas four or five pounds per acre sometimes produce heavy mortality among beneficial species."

Because of misuses by a few individuals, some legislation has been initiated to prohibit or restrict use of certain chemicals, he reported. Failure to observe simple precautions has caused such opposition, and as a result, the general public may be denied the benefits derived from these effective materials. "Obviously, legislative restrictions should be resorted to only when all other alternatives have failed," he commented.

Dr. Dykstra urged better education for the person who uses control materials, and suggested that manufacturers and distributors of these chemicals can contribute to such a program. He stated that the Fish and Wildlife Service as well as other governmental agencies and conservation groups will welcome assistance in such an endeavor.

A parallel situation exists in the case of rodent control, he pointed out. He lauded the use of the new anticoagulant-type rodenticides as having "provided vastly improved means for selective control of rats and mice." Highly toxic materials, such as "1080," he said, cannot be used by the general public with safety. The history of warfarin was reviewed, and a promising future was outlined for it and other new materials such as "tomorin" (3 a-p-chlorophenyl-b-acetylethyl-4-hydroxycoumarin) and "pival" (2-Pivalyl-1,3-indandione).

A decided departure from the usual approach to a given topic was provided by Gene Flack, sales counsel and Director of Advertising, Sunshine Biscuits, Inc., New York, who gave his hearers a new slant on merchandising. "Optimism," he told his audience, is indispensible in selling, and emphasized his points by a series

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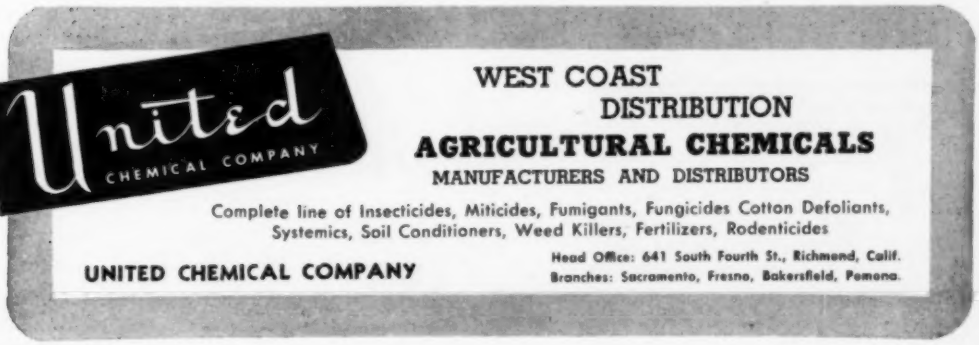
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These pumps are self-priming to about 20 feet when the impeller blades are wet. Where possible a check valve should be installed on the suction side of the pump to insure constant pressure of the liquid being pumped about the impeller. Drive may be either clockwise or counter-clockwise. Maximum pressures range between 20-30 p.s.i. The rubber impeller is keyed to the shaft and may be replaced in a matter of minutes.

CAPACITY TABLES — Gallons of water per minute—1,725 R.P.M. Outlet pressure in feet head and p.s.i.

Pump		Ft.hd.	0	10	20	30	40	50	60	70
No.	Size	p.s.i.	0	4.3	8.7	13.0	17.3	21.6	26	30
RA	½"		6½	6	5¼	4¼	3½	2½	1	—
RB	¾"		10¾	10	9	8	7	5½	4¾	2¼
RC	1"		21½	20	18½	17	15½	13½	11¾	8½

DIMENSIONS

Pump No.	Length	Width	Height	Price
RA	5⅜"	4¼"	4⅛"	$16.00
RB	6⅜"	4¼"	4⅛"	21.00
RC	7⅛"	4⅜"	5⅛"	28.00

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of illustrative stories which kept the conventioneers in nearly continuous laughter.

All selling, he said, is boiled down to three main points: first, one must know his product intimately; he must know the people to whom he wishes to sell his product; and third, he must find the best way to approach and "sell" these people.

His half hour talk was punctuated by his frequently tossing handfuls of cigars into the audience, by descending from the speakers' stand to welcome late-comers with a handshake, and by a loud whistle-salute whenever he mentioned the name of his company.

Secretary's Report

IN his annual report to the Association, Lea S. Hitchner, executive secretary and treasurer, observed that over a period of many years, the history of the pesticide business is marked by seasons similar to the one just past when low sales and high inventories have been brought about by adverse weather conditions and other factors beyond control. "The problems facing producers and distributors of cotton poisons today have occurred regularly on an average of from five to seven years," he said. The older companies have learned how to live through such experiences, the secretary declared. This involved a study and knowledge of problems involving production schedules, handling of inventory carry-over (including physical condition of the insecticides), credits, future sales and other similar factors involved in a matter of this kind.

Actually, very little difference is seen in the problems of today and those of thirty years ago, Mr. Hitchner observed. Even with advanced education of the farmer and the availability of new and more effective materials and methods of application, "the problems are exactly what they were years ago; years of high demand, years of low demand, years when supplies were short and had to be stretched, and years when almost the entire production had to be carried over in inventories."

As a result of this year's experience, he said, the industry's "buy early" campaign has had a severe setback, and great effort must be expended to re-sell distributors, dealers, growers and others, on the necessity for early purchase and reasonable stockpiling by them of pest control chemicals for the cotton program. "No longer is it physically possible for the industry to deliver, after the bugs come, the hundreds of million pounds of pesticides which are needed. We must start again to build a sound program of distribution," he emphasized. Mr. Hitchner made three suggestions which he said would be helpful in preventing recurrence of the imbalance of supply and demand that has characterized the 1952 season, and in developing sound programs of production and distribution.

First, he said, more statistics are needed on production, inventory carry-over, credits, federal and state recommendations and other economic signposts now lacking.

Second, a better coordinated program of education on safe handling and use of pesticides is needed. "Unless this is done, misguided critics will seriously curtail the use of many materials," he warned.

Third: New markets must be developed for pesticides. In this regard, he mentioned the grassland program, the stored grain program, the forest pest control programs and the world export market.

Industry should take the iniative in developing these potentials, he declared, rather than being content to ride on the efforts of state and federal agencies and interested private groups in promoting such programs.

Hoyt Speaks

EXPANSION of agricultural production through the control of insects and plant disease is a goal being sought by the Bureau of Entomology and Plant Quarantine, Avery S. Hoyt, B.E.P.Q. chief told the NAC audience. Insects cause the loss of about 10% of the nation's crops, it was pointed out, and their

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control would represent the equivalent of about 40 million acres. Such a program calls for greater research activities, he said, and this in turn calls not only for operational funds, but for trained personnel as well. Planning in advance must be done and the Bureau is now regionalizing some of its activities to relieve the Washington office and to allow more elasticity in field work.

Mr. Hoyt concluded with a note on sulfur conservation, stating that suitable alternate products are being sought, as are new and more effective insecticides. He raised the question about what is to be done about resistant insects in the matter of public health and to protect agricultural crops, and observed that this problem is one to be kept in mind in long-range research and control programs.

The question of meeting the residue problem was discussed by Dr. George C. Decker, Illinois Natural History Survey entomologist, Urbana, Illinois. The residue problem is "poorly understood and grossly over-estimated by the average layman," Dr. Decker declared. There are some, he said, who think that pesticides should be eliminated, since such materials are used unnecessarily for selfish personal reasons. "That philosophy must be refuted," the Illinois scientist declared. "The general public must be confronted with the fact that if American agriculture is to meet the food requirements of this nation, it must have better—not less efficient—insect and plant disease control." In pioneer days, with many productive acres per capita, we could share crops with the pests and still eat; but not so today, he observed.

The differences between "hazard" and "toxicity" of a given chemical were reviewed by Dr. Decker. "Toxicity is the capacity of a substance to produce injury whereas hazard is the probability that injury will result from the use of the substance in the quantity and in the manner proposed," he pointed out.

Factors determining the persistence and magnitude of pesticide residues are several in number. There-

fore, the presence or absence of an objectionable residue at harvest may be determined by knowledge of the time of treatment (how many days before harvest); stability of the pesticide involved; rate of residue loss; rate of application; number of applications; formulation and absorption of the chemical.

In the final analysis, he said, if all indivduals interested in the future of pest control could and would become fully familiar with the merits and limitations of the various pesticides available and resolve never to make or condone an unsound recommendation, there never could or would be a real residue problem," he concluded.

Export Panel Heard

A PANEL on exports was the final item on the three-day program. Wallace S. Moreland, Rutgers University, New Brunswick, N. J. was moderator of the four-man symposium, composed of John H. S. Barr, vice-president, Pennsalt International Corp.; Earl R. Beckner, chief, Chemicals and Semi-manufactured Products Branch, Manufactured Products Staff, Office of International Materials Policy, U. S. Dept. of State; Phillip H. Groggins, chief, Agricultural Chemicals Section, Chemicals Division, National Production Authority, U. S. Dept. of Commerce; and Dr. Ralph Stewart, director, Agricultural Products Division, Office of International Trade, U. S. Dept. of Commerce.

In his appraisal of the export situation, Mr. Barr said that competition is not limited alone to the U. S., but it comes also from other advanced countries such as England, France, Germany, Italy and Japan. "As a matter of fact, all of these countries have had considerable experience in export work since their economies force them to export," he said. Selling prices are often considerably under those of U. S. products, he said, because of lower labor costs and also lower ocean freight rates. He said that the development of health programs abroad created a greater demand for DDT and in spite of tremendous supply potentials from the U. S. and other countries, new DDT plants are being planned for early construction in certain countries.

Mr. Beckner told about the Working Party on Insecticides which met in Geneva in February. The overall free world capacity for production of technical DDT at that time was 73,570 metric tons, although actual production in 1951 was 58,900 tons, 16,900 tons of which were exported. The United States had about 80% of the capacity, production and exports, he reported. Free world production capacity of DDT in 1952 was expected to exceed 80,000 tons with 62,000 tons in the U. S.

Free world capacity for production of BHC was 138,000 metric tons at the time of the meeting, he said. Production in 1951 was roughly 81,000 tons and exports 28,870 tons. In 1952, BHC production was expected to increase to about 170,000 metric tons. In the case of BHC, the

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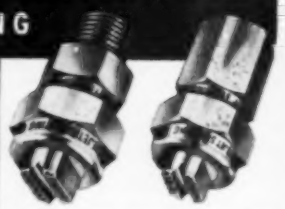

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U. S. had about 72% of total capacity and production, but only 56% of the exports.

Mr. Groggins pointed out the functions of the NPA, which organization he represents, and suggested a number of ways to stimulate and expand exports. He advised that the pesticide manufacturers in the U. S. would be wise to recognize the tendency on the part of many backward countries to awaken and launch new industrial projects on their own.

There are many reasons why the U. S. should continue its role as a major supplier, he said. In the first place, we have raw materials, efficient plants, and technical manpower. But consideration must be given to the fact that Egypt, India and other nations are planning to become independent, or partially so, regarding pesticides.

He suggested, therefore, that we should emphasize exportation of chemicals rather than formulations; we should treat foreign customers with the same consideration given to domestic buyers (to remove the impression that exports are merely a convenient method of draining off surpluses; we should encourage training entomologists, plant pathologists and other scientists who will help build up appreciation for use of agricultural chemicals; we should establish mixing plants in customer countries, operated by nationals so far as possible; and we should encourage participation of foreign capital in such formulation plants.

In summary, Mr. Groggins said that government programs alone, no matter how generously conceived, cannot do the job of improving the economic positions of our friendly nations. Private enterprise can and should assume part of the burden. . ."

Final speaker on the program was Dr. Stewart. He said that the picture for exports in 1952-53 appears "not too bad" and getting export licenses should not be a difficult problem except for sulfur formulations, conditioned and wettable sulfur and copper sulfate. Foreign demand for DDT still remains strong, and last year, a total of 41 different countries imported DDT from the U. S.

Factors due to influence the export picture, he said, are the sulfur shortage, U. S. domestic needs, and availability of dollar exchange in foreign countries. Fewer dollars may be available for some importing countries which made heavy insecticide purchases last season, he pointed out. The U. S. foreign aid program for financing the purchase of DDT and other insecticides is expected to be continued at about the same level as in 1951-52, it was stated.

RESEARCH

(*Continued from Page 47*)

1,400 pounds of 20% superphosphate. Actually, the phosphorus was processed into 25 different materials, which were packaged in 4,824 weighed portions. There were 85 shipments to 37 consignees in 30 States, 2 territories, and 1 foreign country.

The Industry Committee is now being discontinued. The research program is going so well that support by the committee no longer seems to be essential. It is believed, however, that work of the committee may be taken as an indication of the effective manner in which industry funds through timely grants may be used to initiate and stimulate a larger research program.

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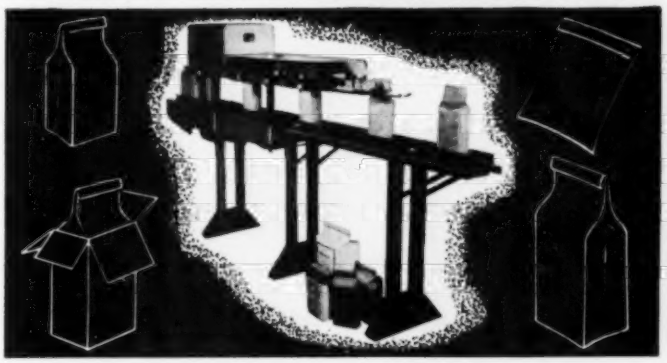

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METHOXYCHLOR

(*Continued from Page 29*)

the third day after spraying but dropped rapidly to 0.4 p.p.m. after 21 days. While the data on dieldrin are the results of treating only one cow, they do agree very closely with bioassay data obtained by Y. P. Sun, of Julius Hyman and Company (unpublished), on milk samples from two other cows similarly treated.

The samples collected from two cows 2 days after the first spraying with CS-708 averaged 0.75 p.p.m. and decreased to 0.53 p.p.m. 14 days after spraying. Two days after the second spraying the average was 1.11 p.p.m. and decreased to 0.20 p.p.m. 21 days after spraying. The average CS-708 content of all milk samples analyzed was 0.64 p.p.m.

Summary.—Jersey cows were given similar spray treatments with 0.5 percent DDT, methoxychlor, CS-708, and dieldrin in order to determine the amount of these insecticides that would be excreted in the milk. The maximum excretion of methoxychlor was approximately 0.5 p.p.m. and was reached the second day after treatment. This was only one-sixth the amount of DDT that was excreted under the same conditions. The maximum excretion of dieldrin was reached the third day after treatment and was more than twice as great as that of DDT. The maximum excretion of CS-708 was reached the second day after spraying and was approximately one-fourth as great as that of DDT.

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AVAILABLE — CHEMIST, Ph.D., with 3 years experience directing insecticide laboratory, 3 years plant manager large insecticide plant, 13 years chemical experience on detergents, emulsifiers, pilot plant and commercial scale chemical production. Successful record established in chemical technology, personnel relationship, research direction, and production methods. Address Box No. 675, c/o **Agricultural Chemicals**.

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Tale Ends

WHILE the recent NAC Association meeting was a pleasant one for a great many people, it is likely to be most memorable to Bill Merritt, Ashcraft-Wilkinson Co., Atlanta, Ga., and Jack Hewitt, of Lebanon Chemical Co., Lebanon, Pa. These two, buddies together in World War II, had not seen each other since about 1945, and each had lost track of the other in the years between; when what should they do at the NAC meeting but run right into each other in the lobby!

The two could hardly believe it at first, but after the first shock, began to exchange reminiscences of their days in the South Pacific around Manilla as members of MacArthur's forces. Jack's wife was with him and Bill was introduced to her as "that buddy you've heard me speak of so much!"

Both men were happy to get acquainted all over again and vow now not to get separated like they were for the years following V-J day.

•

An appropriately - worded menu brought smiles to the lips of the several hundred persons attending the annual phytopath banquet at Cornell University, Ithaca, last month. Included on the menu were "moldy peach, mildewed honeydew and lime aborted relishes; blighted broccoli, black heart potatoes, and rusty lettuce salad with fungous dressing."

(Actually, the banquet brought forth some delicious fare; the menu notwithstanding.)

•

Dr. S. W. Simmons, of the Savannah laboratories of the U. S. Public Health Service, author of previous statements regarding the toxicity of various pesticides in relation to human health, was quoted recently by *Newsweek* magazine as saying that in laboratory tests on human fat DDT has been showing up as purple-red instead of the usual blue-purple color. This indicated the presence of DDE, thought to be a degradation of DDT in the fat, which in turn brought Dr. Simmons' conclusion that it looks "as though the amount of stored toxic material in fat was a lot less dangerous than we had thought."

Apparently, through some process not yet understood, the human body "degrades" DDT to nontoxic DDE, thus greatly reducing the potential danger of the toxicant.

Newsweek quotes Dr. Simmons from an interview as stating that "We think now there is very little indication that DDT is harmful. It is used by the thousands of tons throughout the world and if there is any danger from it . . . we do not know about it."

The magazine article notes that worried people are still writing the Public Health Service to complain about the hazards of using DDT. In these cases, the story says, Dr. Simmons hastens to reply that their fears are baseless.

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